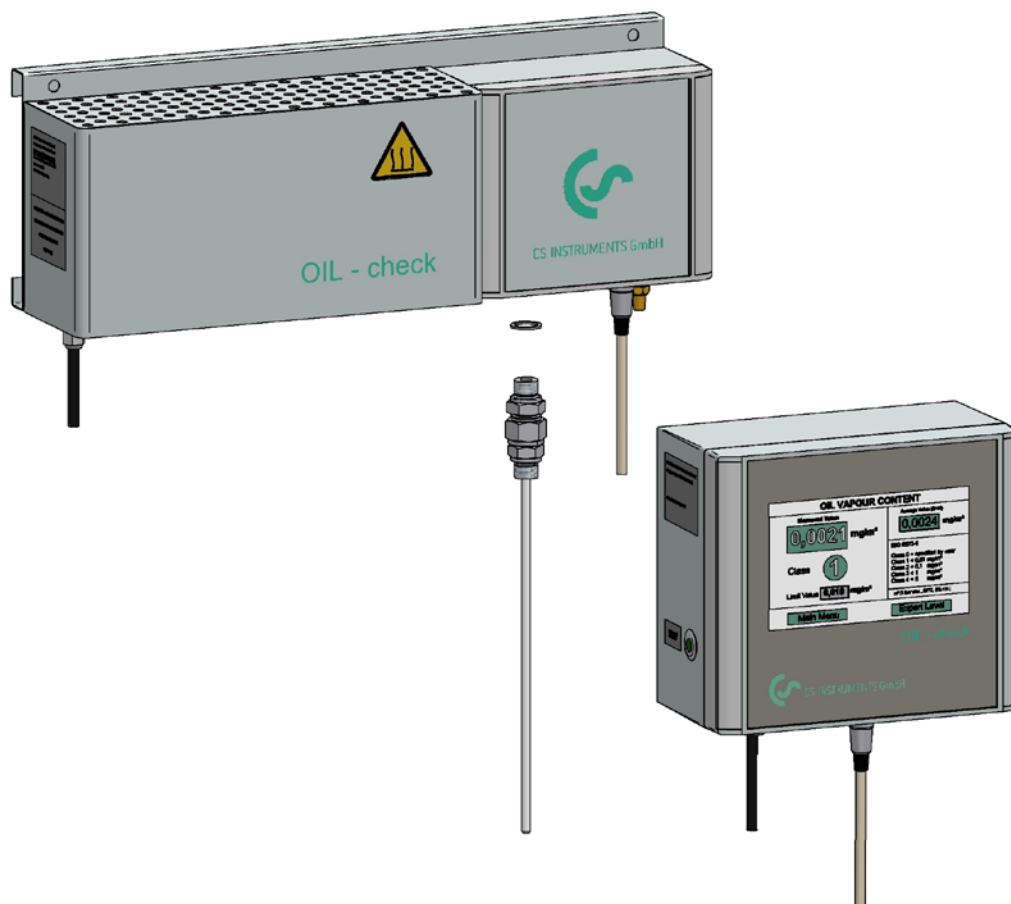


EN - English

## Instructions for installation and operation

# OIL CHECK

## Oil vapour measuring device with sampling probe



Dear customer,

Thank you for deciding in favour of the OIL CHECK measuring device with sampling probe. Please read these installation- and operating instructions carefully before mounting and starting up OIL CHECK, and follow our directions. Perfect functioning of the OIL CHECK, and thus exact measurement and monitoring of the residual oil content in compressed air, can only be guaranteed when the provisions and notes stipulated here are strictly adhered to.

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## 1 Type plates

At the sensor unit and at the housing of the evaluation unit with user interface (display), there are type plates. These comprise all important data of the OIL CHECK. Copy these data to the free fields of the type plates shown below before starting the installation. They must be communicated to the manufacturer or supplier upon request.




Never remove, damage or obliterate type plates!

### 1.1 Sensor unit

<b>OIL CHECK SENSOR UNIT</b>	
Power: AC 230V~ +/-10% / 50Hz / max. 0,2A	
Protection classification: Class I (PE)	
Connection: G3/8 Female ISO 228	
Type of Gas: Compressed Air	
Max. working pressure PS: 16 bar(g)	
Max. working temperature TS: +55°C	
Ambient temperature: +5°C...+45°C	
Type: 4013362	
S/N: 110229435	
	
	
	
CS INSTRUMENTS <a href="http://www.cs-instruments.com">http://www.cs-instruments.com</a>	

!

### 1.2 Evaluation unit with user interface (display)

<b>OIL CHECK EVALUATION UNIT</b>	
Power: AC 230V~ +/-10% / 50Hz / max. 0,3A	
Protection classification: Class I (PE)	
Ambient temperature: +5°C...+50°C	
Type: 4013362	
S/N: 110229435	
B0704809-D139	
	
	
	
CS INSTRUMENTS <a href="http://www.cs-instruments.com">http://www.cs-instruments.com</a>	

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### 3 General advice



Please check, prior to reading the operating instructions, whether or not these instructions correspond to the device by comparing the indications on page 3 with the two type plates (sensor unit and evaluation unit with user interface).

Read these installation and operating instructions carefully prior to any intervention regarding the measuring device.

The operating instructions must be accessible at all times at the place of application of the device.



To ensure safe operation, the device must only be operated and maintained in accordance with the indications in the operating instructions. In addition, the national and operational statutory provisions and safety regulations, as well as the accident prevention regulations required for the respective case of application, need to be observed during employment. This applies accordingly when accessories are used.

Non-observance of the installation and operating instructions involves risks for persons and systems.

The sensor unit and the evaluation unit with user interface (display) must not be opened!

Prior to establishing the connection with the electric supply mains, the housing of the evaluation unit and the sensor unit must be connected with the supplied signalling cable!



System performance tests, installation, setting and service measures must only be carried out by authorised skilled personnel<sup>1</sup>.

As a basic principle, device calibration must only be carried out by authorised skilled personnel.



To prevent contamination of the probe and of the sensor unit, allow compressed air to flow off of the compressed-air system for a short period of time prior to installation.

Stagnant air can lead to an increase of the residual oil content values.

When the system is rendered pressureless, measurement is impossible. An alarm is indicated.

Due to continuous technical development, we reserve the right to implement necessary modifications without prior notice.

If you have any queries regarding these instructions, please contact CS INSTRUMENTS GmbH.



This symbol stands for actions which can also be implemented by the operators, provided that they are skilled and authorised accordingly.



It is our aim to offer you an environmentally-friendly measuring device:

Specific measures for reduced energy consumption.

Packaging made of recycled material.

Please support this concern regarding environmental protection by following all advice given.

---

<sup>1</sup> Authorised skilled personnel are persons who are authorised by the manufacturer, with experience and technical training, who are well-grounded in the respective provisions and laws and capable of carrying out the required works and of identifying and avoiding any risks during the machine transport, installation, operation and maintenance.

Qualified and authorised operators are persons who are instructed by the manufacturer regarding the handling of the OIL CHECK, with experience and technical training, and who are well-grounded in the respective provisions and laws.

## 4 Safety instructions

### 4.1 General safety instructions



#### **DANGER!**

##### **Compressed air!**

When applied incorrectly, compressed air represents an extremely dangerous energy source. Never work on components at the measuring device which are under pressure. Never direct a compressed-air stream at persons. The user must ensure that the installation of the OIL CHECK takes place in compliance with the instructions in the chapter entitled "Installation".

Make sure that no parts of the measuring devices are under pressure or unintentionally supplied with compressed air during the implementation of service measures.



#### **DANGER!**

##### **Overpressure!**

Adhere to the indications on the type plate regarding the maximum pressure!



Before starting installation, it is imperative to ensure that the compressed-air line is pressureless!



#### **DANGER!**

##### **Supply voltage!**

Operation and maintenance of electrically-powered machines and devices must only be undertaken by correspondingly qualified and authorised personnel. Prior to carrying out service measures, no matter which type, the following notes must be considered:

Make sure that no parts of the measuring devices are energised and that the measuring devices cannot be connected with the electric supply mains during service measures.

The device must not be started if the power cables show any damage.

OIL CHECK must not be operated if coverings have been removed.



#### **DANGER!**

##### **Missing earth connection!**

When the earth connection (protective earth) is missing, there is the risk in the event of malfunction, that contactable, conductive components may carry supply voltage. Touching of such parts leads to an electric shock with injuries and death.

It is imperative to connect the plant to earth or to connect the protective conductor according to the regulations.

Do not use plug adapters at the power plug.

Have the power plug replaced by qualified persons, if required.



#### **WARNING!**

##### **Unauthorised interventions!**

Any modification of the measuring device or of the function parameters which has not been checked and approved by the manufacturer leads to the development of potential danger sources.

**WARNING!****Hot surface!**

Personal injury and damage to objects – fire hazard!

Allow the plant to cool down prior to carrying out works on the OIL CHECK! Close off accessible areas and mark them.

**DANGER!****Explosion!**

Exceeding the explosion limit can lead to explosion involving the risk of injury!

When exceeding the admissible residual oil content of 5 mg/m<sup>3</sup>, the compressed-air supply should be interrupted to ensure that the explosion limit will not be reached.

**DANGER!****Release of hazardous substances!**

Inadmissible gases can lead to health damage and poisoning.

OIL CHECK must **only** be operated **with compressed air**, free from aggressive, corrosive, caustic, toxic, flammable and fire-accelerating constituents. Non-compliance with this will involve risks as a result of the release of harmful gases.



In the event of fire, do not use water to extinguish it (neither in the vicinity of the measuring device nor directed directly at the measuring device).

**WARNING!****Unauthorised intervention!**

Unauthorised interventions may endanger persons or plants and lead to malfunction.

Do not open the housing of the sensor unit or of the evaluation unit!



## 4.2 Special advice in accordance with the 97/23/EC Pressure Equipment Directive

The proper use of the compressed-air plant is the basic requirement for safe operation. Therefore, the user must proceed as follows:

- The measuring device must only be employed within the pressure and temperature range limits indicated by the manufacturer on the type plate.
- The maximum operating pressure indicated by the manufacturer on the type plate must not be exceeded. It is the user's task to install the appropriate safety and control devices.
- The OIL CHECK must neither be set up in insufficiently ventilated rooms nor near heat sources or inflammable substances.
- To avoid fractures resulting from material fatigue, the OIL CHECK should not be exposed to vibrations during operation.
- The documents related to the OIL CHECK device (manual, operating instructions, manufacturer's declaration etc.) must be kept safe for future reference.
- No objects whatsoever must be installed at or placed on the OIL CHECK and the connecting lines.



### **WARNING!**

#### **Unauthorised intervention!**

Unauthorised interventions may endanger persons or plants and lead to malfunction.

Tampering, modification and abuse of the pressure devices is forbidden. Users of the devices need to observe the local and national pressure equipment regulations in the country of installation.

## 4.3 Special safety instructions



### **IMPORTANT!**

Overpressure!

Exceeding the maximum pressure can lead to damage in the plant.



Observe the type plate indications regarding the maximum pressure!



### **IMPORTANT!**

Exceeding of the measuring range (red alarm indication)!

Employing the OIL CHECK above the indicated measuring range can damage the device!

Observe measuring range of the sensor unit!  $\leq 0.01 \dots 5.0 \text{ mg/m}^3$  (in accordance with ISO 8573-1)



### **IMPORTANT!**

Overheating!

Overheating will destroy the sensor unit and the evaluation unit.

Observe the permissible storage and transport temperature, as well as the permissible operating temperature (e.g. protect the measuring device against direct sunlight).

### 4.4 Process-dependent hazards



#### **CAUTION!**

Harmful hydrocarbons!

Harmful hydrocarbons can exist in the ductwork.

For example:

- Hydrocarbons and other particles which are toxic or otherwise dangerous to health.
- Particles which are contained in high-temperature gases.

As long as the process conditions are not absolutely safe, corresponding preventive measures must be undertaken, such as the use of a respiratory mask or purging/detoxification of the ductwork, prior to any intervention in the ductwork for maintenance or installation purposes.

Ensure that the ductwork is pressureless prior to carrying out any installation or dismantling works. If you are unsure in certain cases, please contact the responsible safety representative on location and/or read the local safety regulations.



#### **DANGER!**

#### **Release of hazardous substances!**

Inadmissible gases can lead to health damage and poisoning.

OIL CHECK must only be operated with compressed air, free from aggressive, corrosive, caustic, toxic, flammable and fire-accelerating constituents. Measurements in aggressive, corrosive, caustic, toxic, flammable and fire-accelerating media are not allowed.

## 5 Field of application and proper use of the OIL CHECK

The OIL CHECK devices serve for the stationary measurement and monitoring of the vaporous and gaseous residual oil content in compressed air (ISO 8573:2001). Any other use is considered improper.

The manufacturer shall not be liable for the consequences of improper use; the user alone is responsible for all risks that may arise.

The proper employment and use of the OIL CHECK according to directions requires the exact compliance with the installation instructions, in particular in respect of:

- The place of installation, installation conditions
- The supply voltage and frequency
- The pressure, temperature and humidity of the inlet air
- The ambient temperature

The device is supplied as accepted in the factory. The user only needs to establish the connections with the supply mains and interconnect the components, which is described in the following chapters.



#### **WARNING!**

#### **Employment for the prevention of dangerous conditions!**

A device of the OIL CHECK series must not be employed as the sole means of preventing dangerous conditions at machines and plants.

Machines and plants must be constructed in such a manner that defective conditions do not lead to a dangerous situation for persons or plants.



**WARNING!**

**Improper use!**

The OIL CHECK measuring devices offer state-of-the-art technology and are operationally safe. Residual risks may emanate from the measuring device when improperly employed and operated by untrained personnel.



The OIL CHECK measuring devices must only be used by qualified and authorised personnel and exclusively in accordance with the technical data.

## 6 Technical data

### 6.1 OIL CHECK sensor unit

Measuring medium:	Compressed-air free from aggressive, corrosive, caustic, toxic, flammable and fire-accelerating constituents
Measurand:	Residual oil content in mg oil / standard m <sup>3</sup> (based on 1.0 bar, +20°C, 0% relative humidity) in accordance with ISO 8573-1
Identifiable substances:	Polyalphaolefins, aromatics Aliphatic hydrocarbons Hydrocarbons Functional hydrocarbons
Ambient temperature:	+5°C to +45°C
Compressed-air temperature at the inlet:	+5°C to +55°C
Operating overpressure:	3 bar(g) to max. 16 bar(g) --> see type plate (cf. also page 3)
Measuring gas humidity:	≤ 40 % rel. humidity, pressure dew point max. +10°C, non-condensable humidity
Measuring range:	≤ 0.01 – 5.000 mg/m <sup>3</sup> residual oil content (in accordance with ISO 8573-1)
Measuring accuracy:	The measuring accuracy is 0.003 mg/m <sup>3</sup> .
Detection limit (residual oil):	0.0006 mg/m <sup>3</sup>
Amount of measuring gas:	Approx. 2 to 3 standard litres/minute related to 1.0 bar absolute and +20°C (expanded) The amount of measuring gas depends on the operating pressure.



#### NOTE!

The measuring gas is released into the environment. Please consider the resulting concentration values at the place of installation of the OIL CHECK. Ensure sufficient ventilation.

Fields of application:	Downstream of an activated-carbon filter (see installation instructions Chapter 10.5) Downstream of an activated-carbon adsorber Downstream of a BEKOKAT (catalytic converter) Downstream of an oil-free compressor <b>Each with corresponding upstream filtration and drying</b>
------------------------	---

Dimensions:	487 x 170 x 120 mm (W x H x D)
Weight:	Approx. 6.6 kg
Power supply:	Version 1: 230 V AC 50 Hz +/- 10% Version 2: 115 V AC 60 Hz +/- 10%
Max. operating current:	0.3 A at 230 VAC
Power consumption:	41 W
External fusing:	2.0 A, slow, recommended
Power cord:	Max. cladding diameter: 6.5 mm, strand cross section: 0.75 mm <sup>2</sup> , with safety plug and PE protective earthing
Protection class:	Standard IP 20
Connection probe:	G 3/8" internal thread
Probe type 1:	DN 20 to DN 40 3/4" to 1 1/2"
Probe type 2:	DN 50 to DN 80 2" to 3"
Probe type 3 :	> DN 80 produced in accordance with the customer's requirements

## 6.2 Evaluation unit with user interface (display)

Dimensions:	230 x 200 x 120 mm (W x H x D)
Weight:	Approx. 3.6 kg
Protection class:	Standard IP 54
Operating temperature:	+5..+50 °C
Storage temperature:	+5..+50 °C
Resistance to climatic conditions:	Rel. humidity $\leq$ 75% annual mean without dew
Power cord:	Max. cladding diameter: 6.5 mm, strand cross: 0.75 mm <sup>2</sup> , with safety plug and PE protective earthing
Outputs:	Potential-free change-over contact, 230V/AC 5A or 24V/DC 5A optional 4....20 mA
Power supply:	Version 1: 230 V AC 50 Hz +/- 10% Version 2: 115 V AC 60 Hz +/- 10%
Internal fusing:	1.0 A, slow (T1A / 250V)
Max. operating current:	Max. 0.22 A
Power consumption:	Max. 50.6 VA
Memory:	2 GB internal memory

## 6.3 EU directives and harmonised standards applied

<b>2006/95/EC</b>	Low-Voltage Directive
<b>2004/108/EC</b>	Directive about the electromagnetic compatibility, EMC
<b>EN 61010-1</b>	Safety requirements for electrical equipment for measurement, control and laboratory use
<b>EN 61326-1</b>	Electrical equipment for measurement, control and laboratory use EMC requirements

## 6.4 Installation requirements

Installation requirements: Vertically into the rising main via oil and grease-free measuring section  
Alternatively via heated analysis hoses

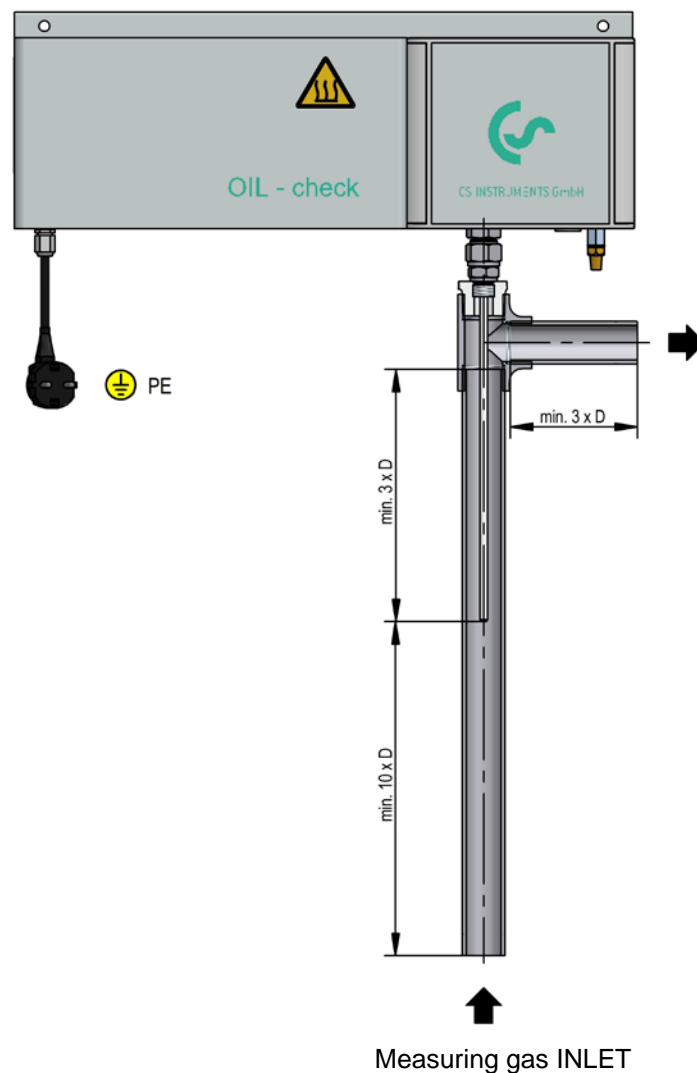
In general, the requirements on homogeneous flow conditions and concentrations are met when sampling takes place in a straight pipe section with an inlet section of at least five hydraulic diameters (**5 x DN**) and an outlet section of three hydraulic diameters (**3 x DN**). In addition, the pipe section must have a constant shape and a constant cross-section.

Inlet zone: 10 x DN (min. 200 mm) in accordance with ISO 8573-2

Outlet zone: 3 x DN (min. 100 mm) in accordance with ISO 8573-2

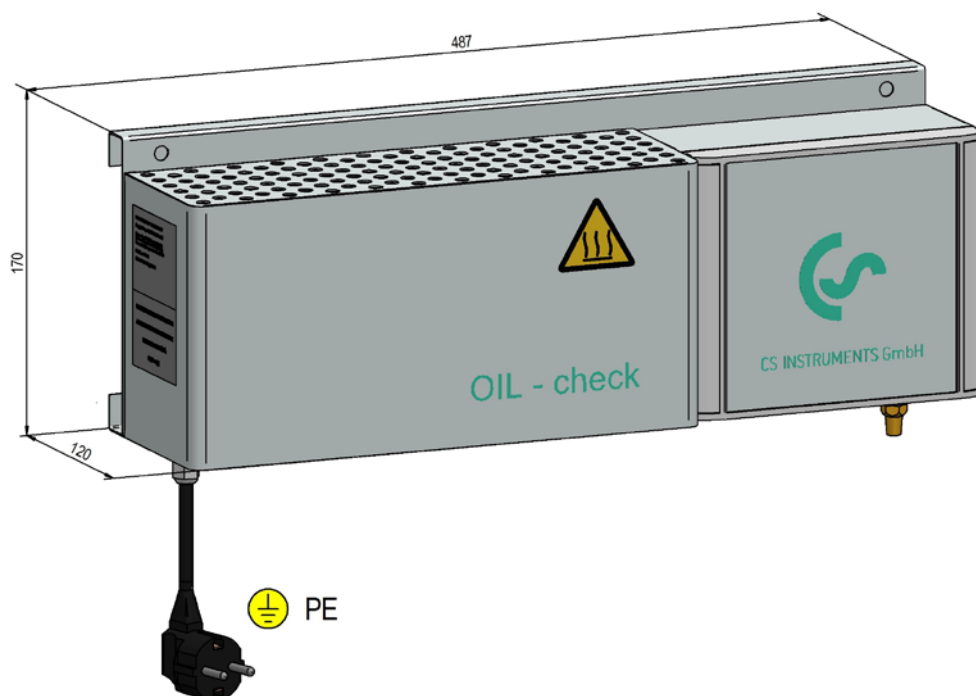
For the measuring sections made by CS INSTRUMENTS or for measuring sections which are manufactured according to the specifications of CS INSTRUMENTS, we recommend guide values for the minimum flow of the compressed air in the measuring sections, to ensure representative sampling. You will find these guide values in a table in the Appendix.

Minimum flow: See table in the Appendix



Dimensions

## 6.4.1 Sensor unit



You will find the dimensioning of the mounting holes in the Appendix.

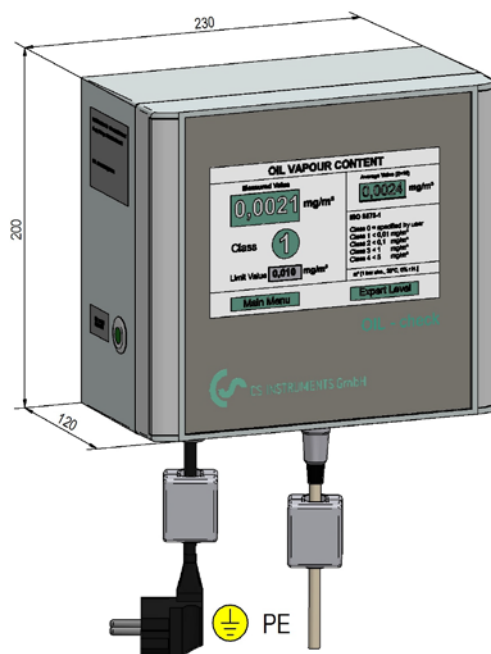


**Please make sure to observe the servicing height when choosing the place of installation.**

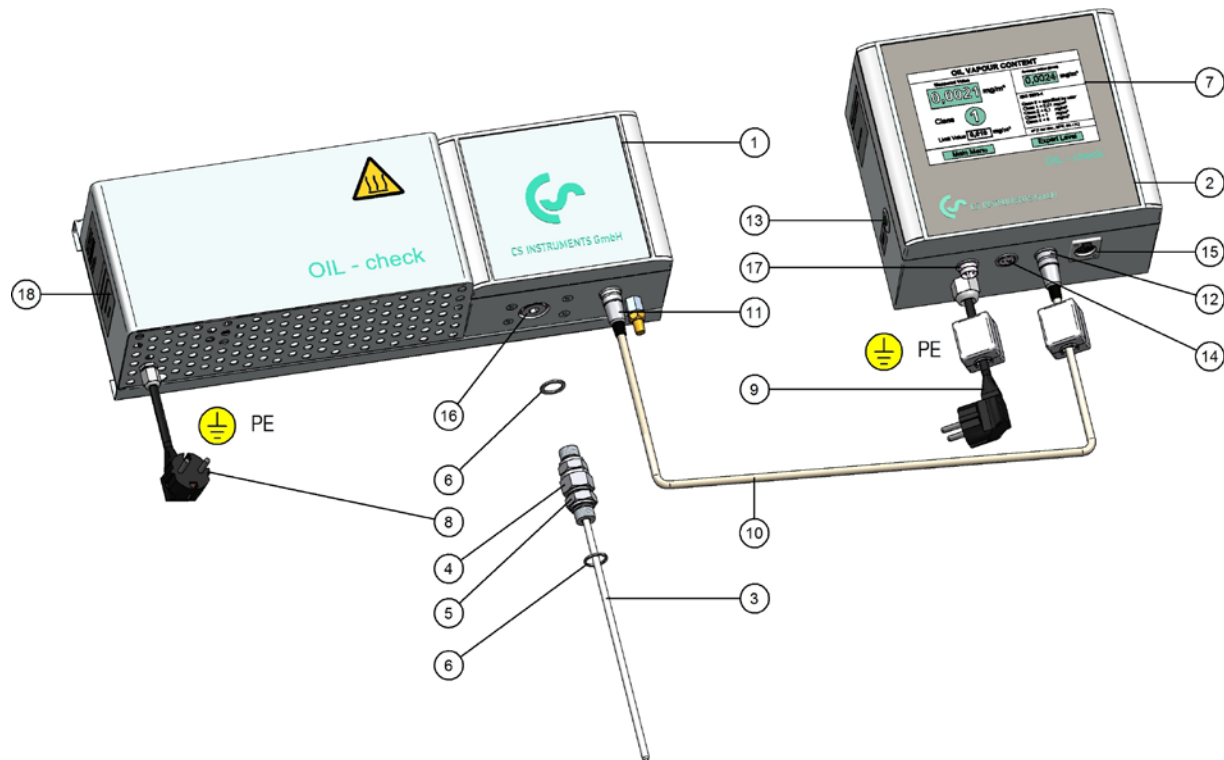
Servicing height with probe type 1: 500 mm

Servicing height with probe type 2: 700 mm

## 6.4.2 Evaluation unit with user interface



## 6.5 Illustration of the device



- 1 - Sensor unit
- 2 - Evaluation unit with user interface (display)
- 3 - Sampling probe
- 4 - Union nut
- 5 - Screw-connection body with G 3/8" external thread
- 6 - Stationary seal ring (2x)
- 7 - User interface / touchscreen
- 8 - Power supply cable for the sensor unit
- 9 - Power supply cable for the evaluation unit
- 10 - Signalling cable
- 11 - Connection signalling cable sensor unit
- 12 - Connection signalling cable evaluation unit
- 13 - On / off switch incl. indicator (green LED)
- 14 - Connection analogue output 4-20 mA (see Chapter 13.5.2, page 64)
- 15 - Connection Ethernet
- 16 - Measuring-gas connection "M"
- 19 - Connection potential-free alarm contact (see Chapter 13.5.1, page 58)
- 20 - Specification regarding the adjusted operating pressure



## 6.6 Adjusted operating pressure

When delivered, the OIL CHECK has been prepared and adjusted to the operating pressure indicated by you. You will find this setting below the type plate of the sensor unit.

EINGESTELLTER ARBEITSDRUCK  
ADJUSTED WORKING PRESSURE  
PRESSION REGLÉE À  
**7.5 bar(g)**

Please contact us in the event that your operating conditions have changed. The CS INSTRUMENTS service team will then adjust your device correspondingly.

## 7 System and functional description

The OIL CHECK was developed for the detection of vaporous and gaseous hydrocarbons in compressed air free from aggressive, caustic, toxic, flammable and fire-accelerating constituents.

When the stipulated installation requirements are met, aerosols should not exist at the inlet into the OIL CHECK device. Irrespective of this, oil components in the form of aerosols with a concentration of max. 5 mg/m<sup>3</sup> are detected and indicated. However, isokinetic sampling does not take place (identical velocity at the place of withdrawal and in the measuring device), as this is not a constituent part of DIN ISO 8573 for oil vapour. The aerosol content would therefore be determined underkinetically with the result that a higher measured value than the actual one is indicated. As far as aerosols are concerned though, there is a danger that the measuring device will be contaminated very strongly at high concentrations and that, as a result, no usable data can be acquired. This condition is identified by the sensor electronics and indicated as a failure on the display. Simultaneously, information about necessary measures is provided to the customer, e.g. cleaning measures or purging with zero air.

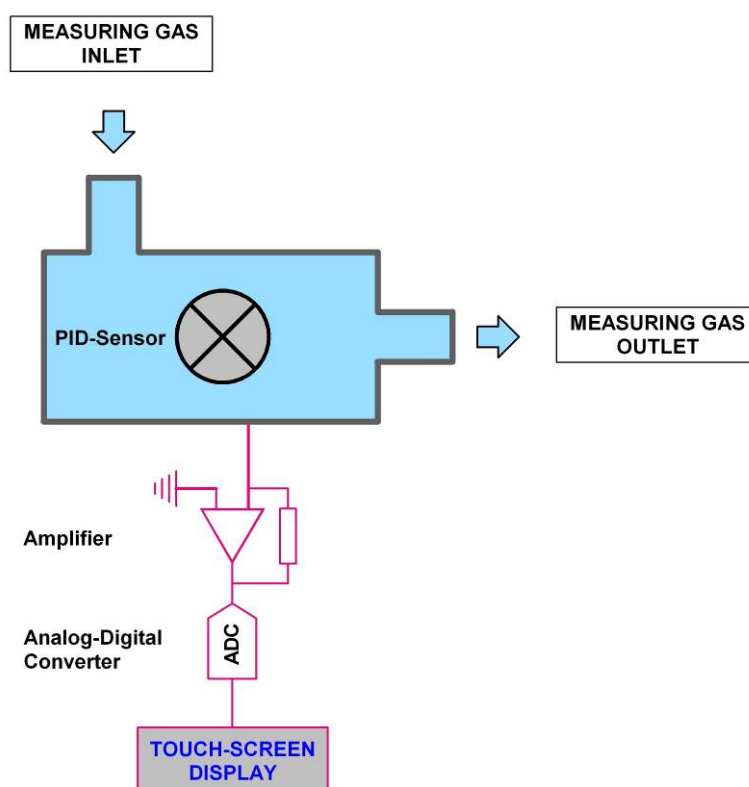
The OIL CHECK consists of two major components, the sensor unit with sampling probe and the evaluation unit with user interface (display). Via a signalling cable with a length of 5 m, the sensor unit is connected with the evaluation unit. The sampling probe is installed centrally from the top in the rising main, so that the probe takes compressed air in the centre of the compressed-air flow to be monitored.

The sensor of the OIL CHECK functions according to the proven and reliable principle of photoionisation.

The measuring principle of a photoionisation detector **PID** is based on the ionisation of the gas molecules through **UV radiation** and registration of the resulting ion current. The normal components of the compressed air (oxygen, nitrogen, carbon dioxide, argon, water etc.) are not ionised by the UV lamp. In contrast, hydrocarbons are reliably ionised. The strength of the ion current is directly proportional to the concentration of the ionised molecules. The electrical signal is measured, electronically amplified, and shown on the display as the total of the measured substances.

For corresponding operational reliability, the performance of the sensing technology is continuously monitored during the measurements. In the event that a defined safety limit value has not been reached, an alarm is activated which informs the user that the device needs to be checked by CS INSTRUMENTS. A clear text will appear which is highlighted in red.

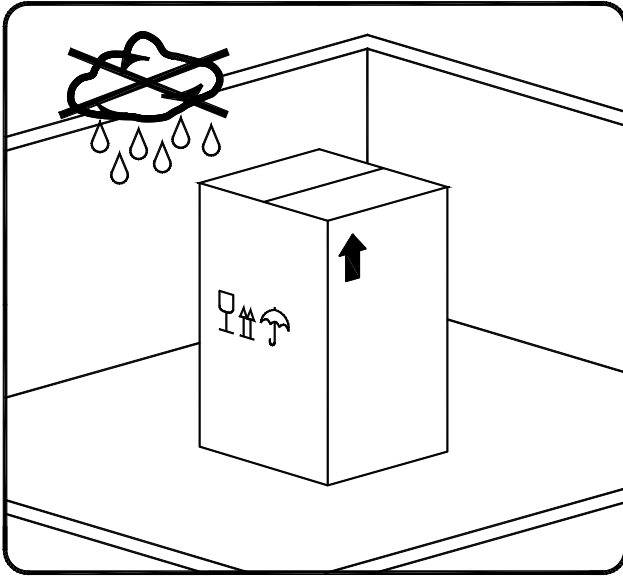
The PID sensor shows the overall concentration of all photoionisable compounds contained in the sample and does not differentiate between individual components/substances. Even hydrocarbon compounds with less than six carbon atoms (<C<sub>6</sub>) can be detected, e.g. isobutene. However, this requires these molecules to be ionised by the UV lamp.



## 8 Transport and storage



- During the transport, the permissible temperature of 50°C (storage temperature) must not be exceeded.
- Transport should only take place in the original packaging.
- Protect the device against falls or excessive vibrations.



Protect the device against atmospheric influences even when packaged.

The OIL CHECK must be protected against falls and excessive vibrations at the place of storage.

Store the OIL CHECK in the original packaging in a closed, frost-protected room at a maximum temperature of +50°C and an air humidity of max. 75%.

If the storage period exceeds 12 months, you should contact the manufacturer.

The installation and operating instructions should be kept with the device!

## 9 Unpacking

After having checked the soundness of the outer packaging, set up and unpack the device in close proximity to the selected places of installation of the sensor and the evaluation unit.



For the connection to the sensor unit, do not touch the probe without wearing oil- and grease-free gloves (textile gloves are recommended). A fingermark on the probe or in the measuring zone can affect the measuring results or lead to false measurements.

Handle the device with due care.

Strong shocks cause irreparable damage.

When not directly employing the OIL CHECK, keep the device in the original packaging!

The installation and operating instructions should be kept with the device!



The packaging consists of recycled material.

Dispose of each individual material separately in accordance with the local provisions.

### 10 Installation

For safe operation and functionality, all indications and advice given in the installation and operating instructions must be adhered to. In addition, the statutory provisions and safety regulations required for the respective case of application need to be observed during employment. This applies accordingly when accessories are used.

#### 10.1 Place of installation



##### **CAUTION!**

##### **Ambient conditions!**

Choose a place of installation which cannot impair the specified function of the OIL CHECK.

Installation in ambient conditions which are not suitable affects the measuring results and can lead to malfunctions and damage to the sensor.

The device must not be operated in an explosive environment or in areas with high fire danger, near aggressive chemicals and superheated steam, in a very hot environment or in strongly contaminated zones.



Do **not use water** for **fire fighting** on or in the vicinity of the OIL CHECK.

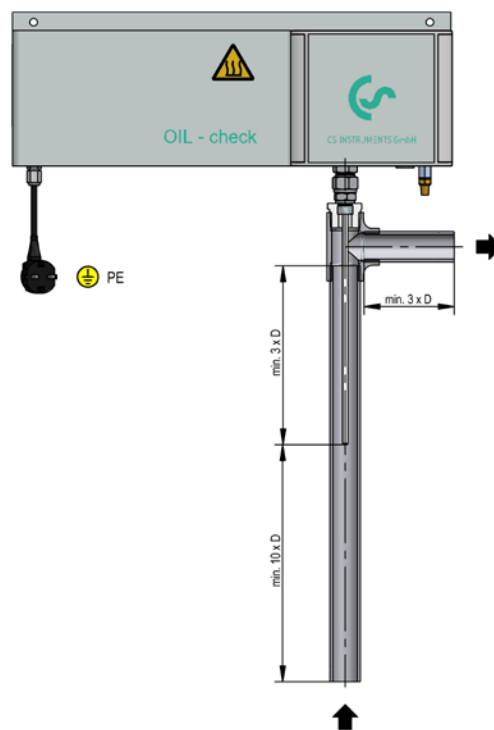
### Basic requirements regarding the installation:



The measuring gases must be free from dust and water when supplied to the OIL CHECK measuring device. Therefore, gas processing adjusted to the measurement task is required in most application cases.

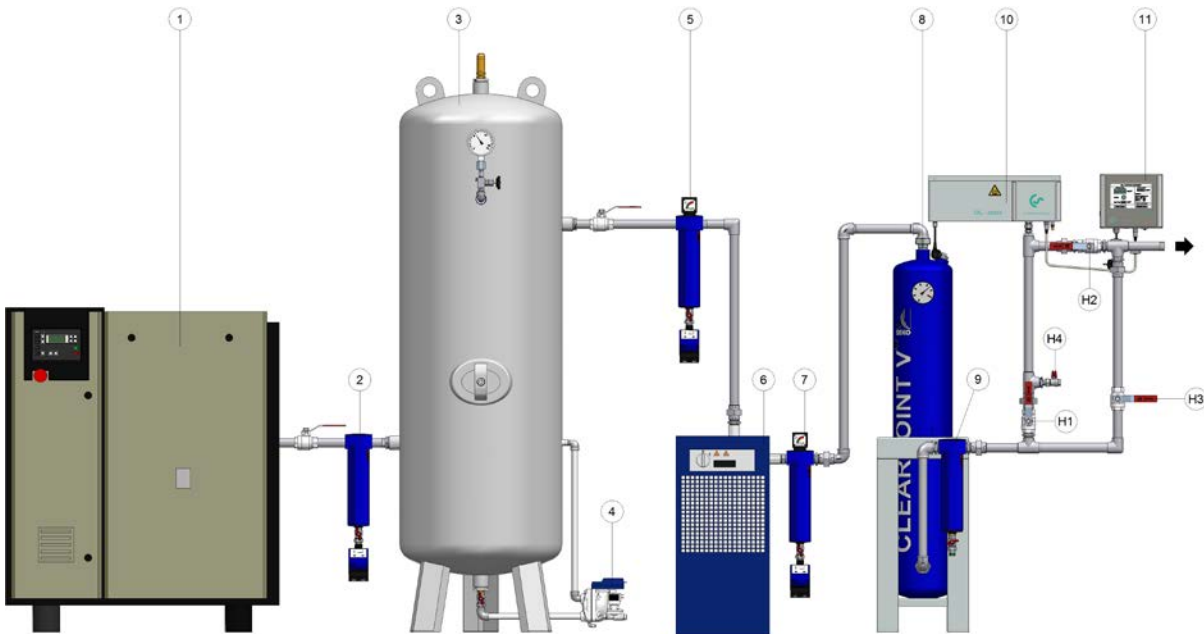
Choose a clean, dry and dust-free room which is protected against storm.

- The OIL CHECK must not be employed in a hazardous area!
- The measuring section must meet the following requirements:
  - centric probe seating
  - made of stainless steel
  - oil- and grease-free
  - dimensions in accordance with the CS INSTRUMENTS provisions
  - inflow towards the probe from the bottom to the top (see flow direction)
- The measuring section must be installed vertically.
- The employment of an original CS INSTRUMENTS measuring section is recommended.
- The installation of a bypass (see Chapter 10.5) or of a ball valve between the sensor unit and the measuring section is recommended.
- Ambient temperature (sensor unit) +5°C to 45°C.
- Ambient temperature (evaluation unit with user interface) +5°C to +50°C.
- The maximum pressure dew point of +10°C must not be exceeded.
- Other connection possibilities and measuring methods are possible, depending on the respective application. Please contact us in this regard.



Measuring  
gas inlet

## 10.2 Installation diagram OIL CHECK with activated carbon adsorber



- 1 Compressor
- 2 Cyclone separator with BEKOMAT
- 3 Compressed-air tank
- 4 BEKOMAT for the tank drainage
- 5 Fine filter (F) with BEKOMAT
- 6 Minimum requirement: refrigeration dryer
- 7 Super-fine filter (S) with BEKOMAT
- 8 Activated-carbon adsorber
- 9 Dust filter (S) with manual drain
- 10 Sensor unit OIL CHECK
- 11 Evaluation unit with user interface (display) OIL CHECK
- H1/H2 Shut-off valves of the measuring section
- H3 Shut-off valve of the bypass
- H4 Vent valve of the measuring section

Oil-and grease-free zone

The depicted installation shows the minimum requirement of the OIL CHECK in combination with an activated-carbon adsorber. Other types of installation are possible (provided that they meet the defined operating conditions).

For service measures, it is recommended to install a bypass at the OIL CHECK. This applies generally to all components to be serviced in compressed-air systems.

Please observe that this bypass must also be free from oil and grease!

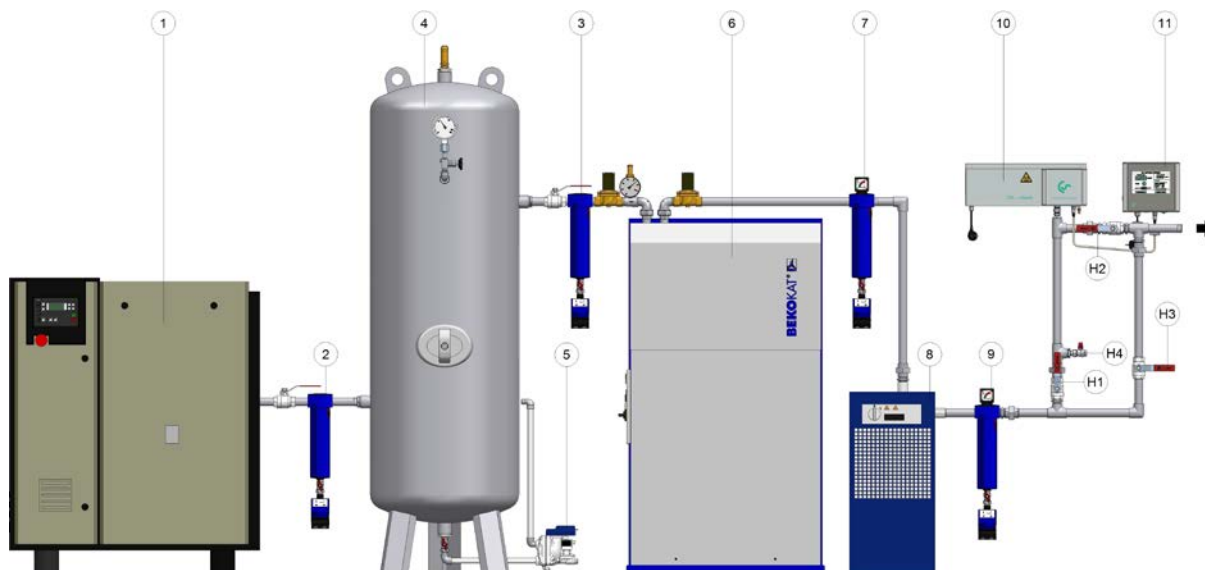


### CAUTION!

#### Contaminated input air – inferior operating conditions!

When employing the OIL CHECK under inferior operating conditions, the device can be contaminated, damaged or destroyed!

### 10.3 Installation diagram OIL CHECK with BEKOKAT



- |       |  |
|-------|--|
| 1     | Compressor (oil-lubricated)  |
| 2     | Cyclone separator with BEKOMAT   |
| 3     | Universal filter (G) with BEKOMAT (OPTIONAL at strongly contaminated compressed air) |
| 4     | Compressed-air tank  |
| 5     | BEKOMAT for the tank drainage  |
| 6     | BEKOKAT  |
| 7     | Dust filter (F) with BEKOMAT   |
| 8     | Minimum requirement: refrigeration dryer   |
| 9     | Super-fine filter (S) with BEKOMAT   |
| 10    | Sensor unit OIL CHECK  |
| 11    | Evaluation unit with user interface (display) OIL CHECK                              |
| H1/H2 | Shut-off valves of the measuring section   |
| H3    | Shut-off valve of the bypass   |
| H4    | Vent valve of the measuring section  |
- Oil-and grease-free zone

The depicted installation shows the minimum requirement of the OIL CHECK in combination with a BEKOKAT. Other types of installation are possible (provided that they meet the defined operating conditions).

For service measures, it is recommended to install a bypass at the OIL CHECK. This applies generally to all components to be serviced in compressed-air systems.

Please observe that this bypass must also be free from oil and grease!

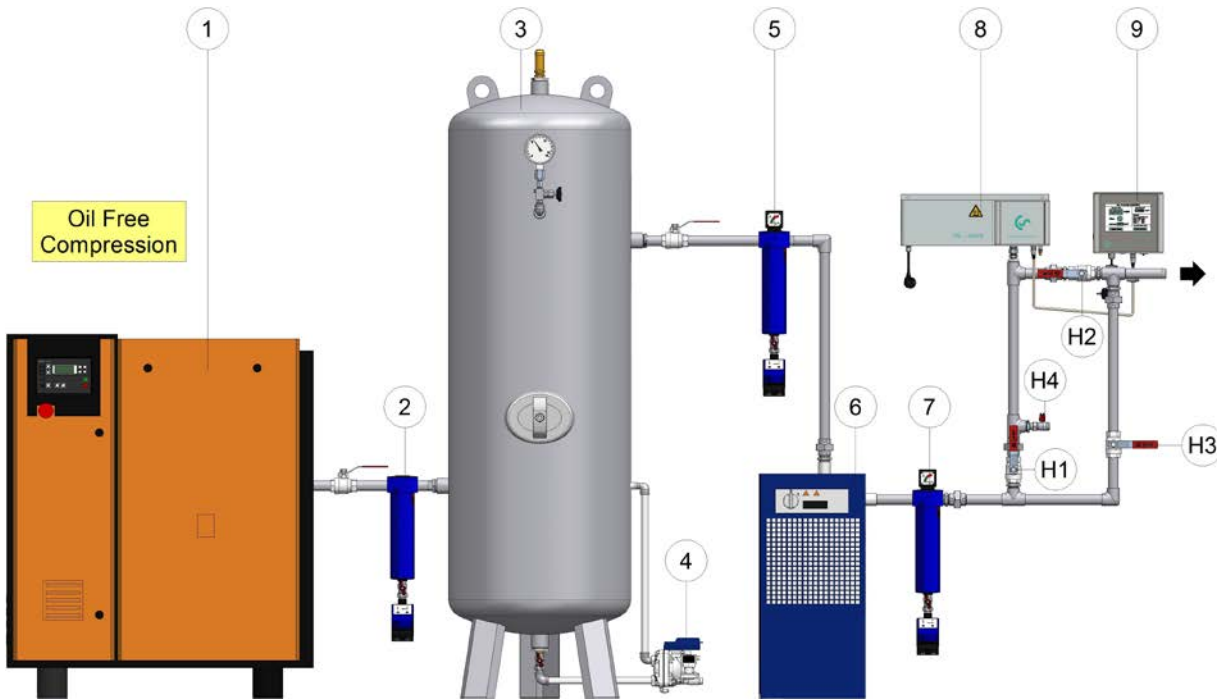


#### CAUTION!

#### Contaminated input air – inferior operating conditions!

When employing the OIL CHECK under inferior operating conditions, the device can be contaminated, damaged or destroyed!

## 10.4 Installation diagram OIL CHECK with oil-free compression



- 1 Compressor with oil-free compression !
- 2 Cyclone separator with BEKOMAT
- 3 Compressed-air tank
- 4 BEKOMAT for the tank drainage
- 5 Universal filter (G) with BEKOMAT
- 6 Minimum requirement: refrigeration dryer
- 7 Super-fine filter (S) with BEKOMAT
- 8 Sensor unit OIL CHECK
- 9 Evaluation unit with user interface (display) OIL CHECK
- H1/H2 Shut-off valves of the measuring section
- H3 Shut-off valve of the bypass
- H4 Vent valve of the measuring section

The depicted installation shows the minimum requirement of the OIL CHECK in combination with a compressor with oil-free compression. Other types of installation are possible (provided that they meet the defined operating conditions).

For service measures, it is recommended to install a bypass at the OIL CHECK. This applies generally to all components to be serviced in compressed-air systems.

Please observe that this bypass must also be free from oil and grease!



### CAUTION!

#### Contaminated input air – inferior operating conditions!

When employing the OIL CHECK under inferior operating conditions, the device can be contaminated, damaged or destroyed!



### 10.5 Installation of OIL CHECK downstream of an activated-carbon filter

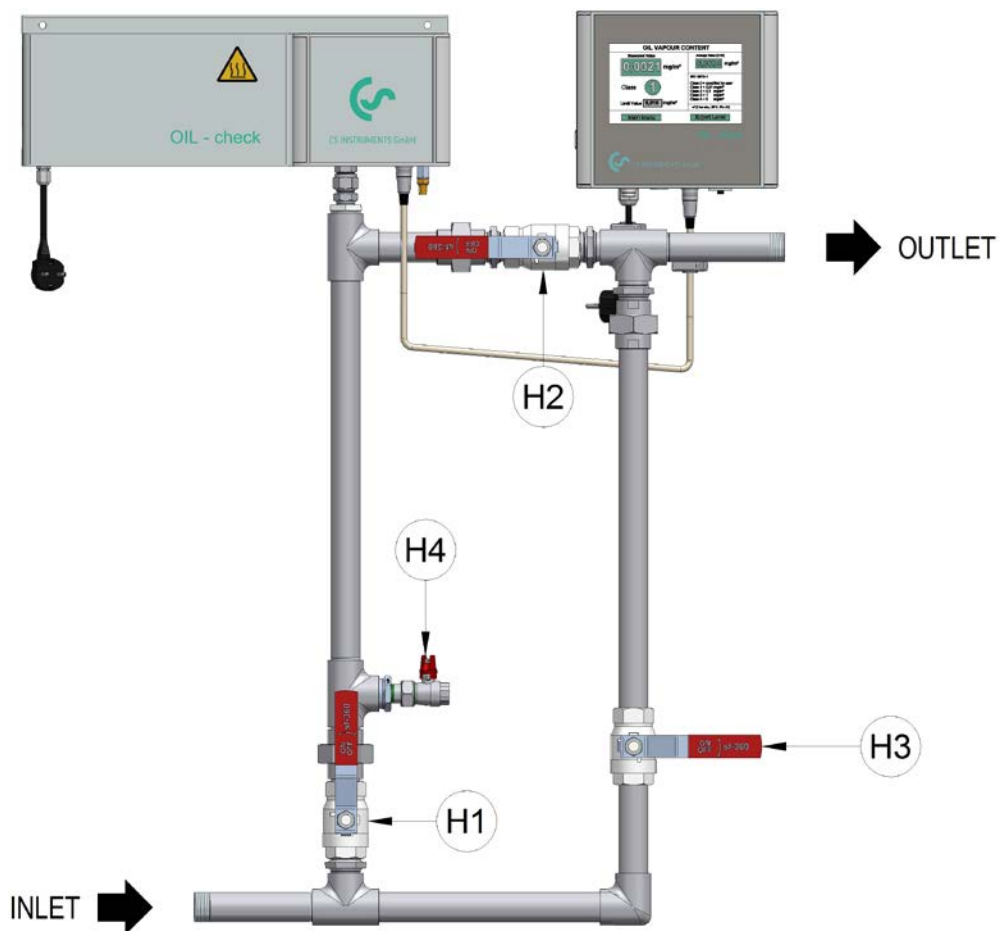
When installing OIL CHECK downstream of an activated-carbon filter, reading-out/monitoring of the measured values should be carried out at an interval which is adapted to the shorter maintenance interval of the activated-carbon filter. This installation variant also requires the compliance with the specifications of Chapter 9.1.

**CAUTION!****Contaminated input air – inferior operating conditions!**

When employing the OIL CHECK under inferior operating conditions, the device can be contaminated, damaged or destroyed!

## 10.6 Installation diagram bypass installation for OIL CHECK

For calibration, maintenance and service, it is recommendable to make use of the CS INSTRUMENTS service. To facilitate these works, a bypass (see the example below) should be installed. This bypass is also advantageous when cleaning the device.



## 10.7 Installation steps



The OIL CHECK measuring devices must only be installed and used by qualified and authorised personnel, and exclusively in accordance with the technical data.



For the connection to the sensor unit, do not touch the probe without wearing oil- and grease-free gloves (textile gloves are recommended). A fingermark on the probe or in the measuring zone can affect the measuring results or lead to false measurements.



Prior to installation, allow compressed air to flow off for a short period of time to remove condensate and particles. This will prevent the unnecessary contamination of the probe and of the sensor unit.



### NOTE!

Strong variations of the ambient temperature, also during transport and storage can lead to damage to the device or to incorrect measuring results.

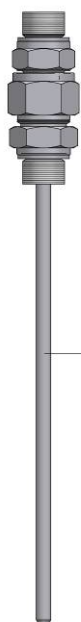


Please make sure that the OIL CHECK device is unpacked and stored approximately three hours prior to installation at the place of installation so as to allow the temperature adaption to the ambient temperature. During this period, the sensor unit must not be connected to the power supply. Careful observance of this point is imperative in particular in the case of major temperature differences between the transport / place of storage and the place of use.



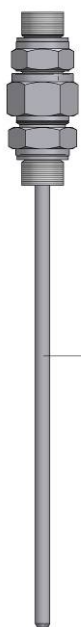
The reference gas generation unit requires a pre-heating time of approx. two hours. Only after this pre-heating time has expired may compressed air flow through the OIL CHECK device. To reduce the waiting time, the sensor unit can be connected to the power supply at this time.

### Unpacking of the OIL CHECK (steps 1 – 3)



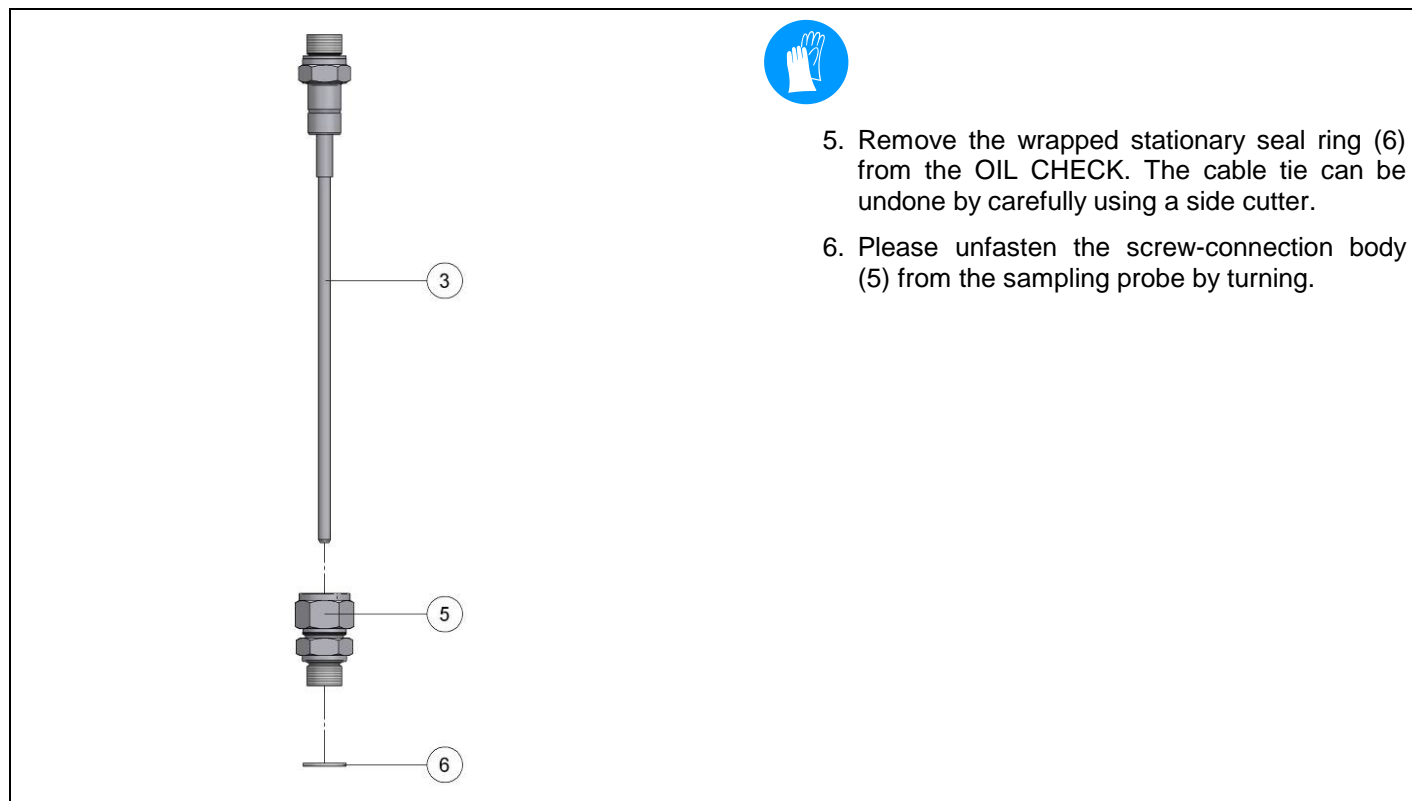
1. Please wear clean (oil-and grease-free) gloves during the entire installation of the OIL CHECK
2. Please take the probe (3) of the OIL CHECK from the packaging and make sure that you do not yet remove the sheet package of the sampling probe.
3. Please keep the supplied documentations in a safe place.

### Removal of the sheet package (step 4)



4. Prior to removing the sheet, please make sure to wear oil- and grease-free gloves and see that the probe is not damaged during the removal.

### Unfastening of the stationary seal ring and of the screw-connection body (steps 5 – 6)



### Mounting of the stationary seal ring and of the screw connection body (steps 7 – 8)



#### **DANGER!**

#### **Overpressure!**

Observe the type plate indications regarding the maximum pressure!



It is imperative that the compressed-air line is pressureless prior to installation!



#### **DANGER!**

#### **Compressed air!**

The process steps described in the following must be carried out by correspondingly qualified personnel. Never carry out works on a plant which is under pressure.



The user must ensure that the OIL CHECK is never operated at a pressure exceeding the value indicated on the type plate. Exceeding the maximum operating pressure can cause both injuries and severe damage to the measuring device.




The sampling probe has a G 3/8" internal thread connection. Other connections are possible for custom-made special probes.

The sampling probe must be installed vertically in the rising main.

Touch the sampling probe only at the upper part, in front of the housing. Hands/fingers exude grease which may lead to incorrect measuring results.

The reference gas generation unit requires a pre-heating time of approx. two hours. Only after this pre-heating time has expired may compressed air flow through the device.

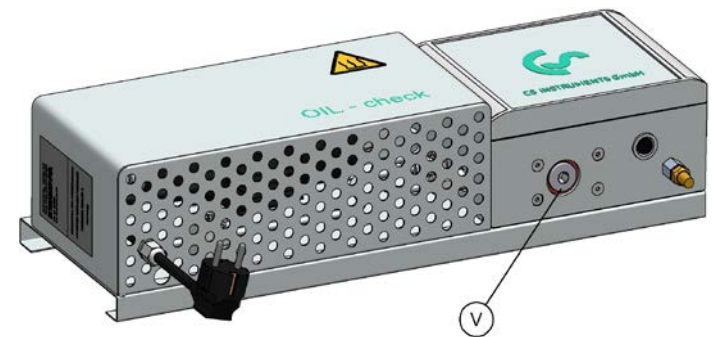
### Mounting of the stationary seal ring and of the screw-connection body (steps 7 – 8)



The diagram shows a vertical measuring section with a horizontal branch. A screw-connection body (5) is shown being inserted into the top of the vertical section. A stationary seal ring (6) is shown being placed on the horizontal branch. A blue circular icon with a white glove symbol is positioned to the right of the diagram.

7. Please place the stationary seal ring (6) on the mounting point on the already-installed measuring section.
8. Now screw the screw-connection body (5), unfastened in step 6, into the thread at the measuring section. Make sure not to damage the stationary seal ring when doing so.

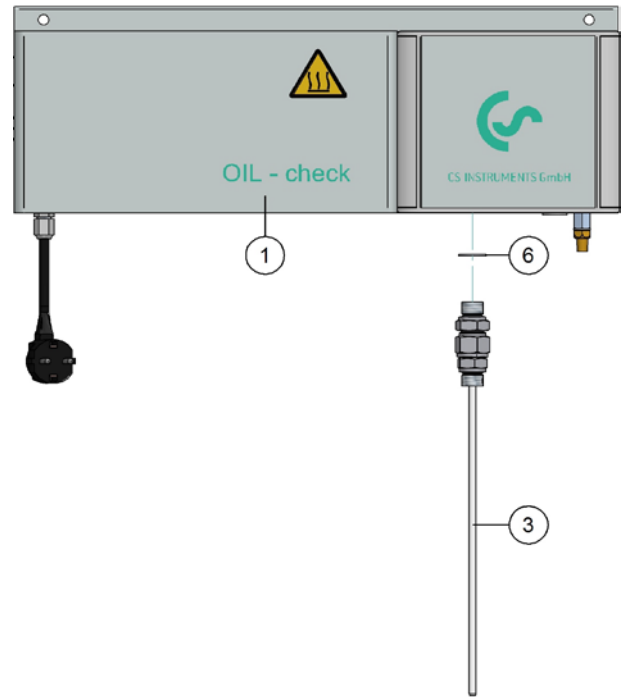
### Removal of the probe closure (step 9)



The diagram shows a rectangular sensor unit with a perforated front panel. A closing plug (V) is shown being removed from the front panel. A blue circular icon with a white glove symbol is positioned to the right of the diagram.

9. Please remove the closing plug (V) with the second stationary seal ring with a suitable hollow hexagon wrench.

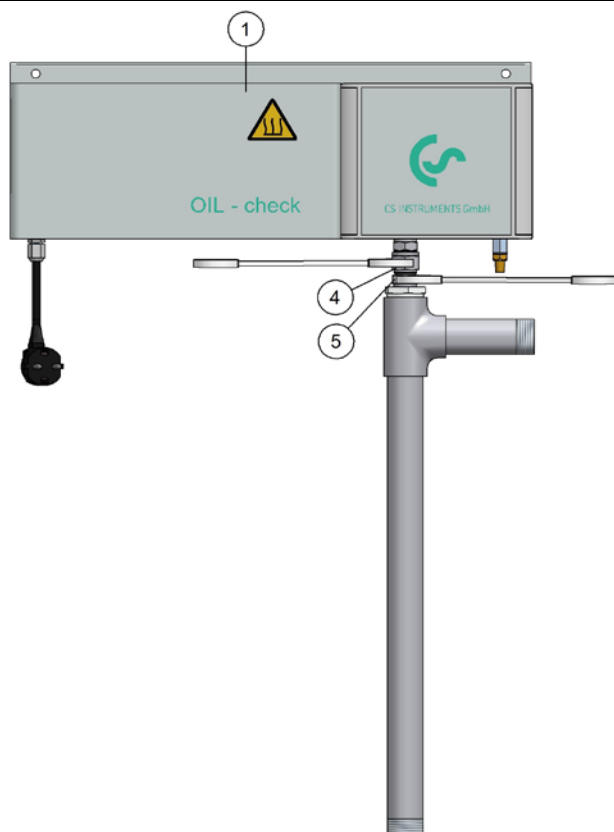
### Connection of the probe with the sensor unit and mounting of the stationary seal ring (step 10)



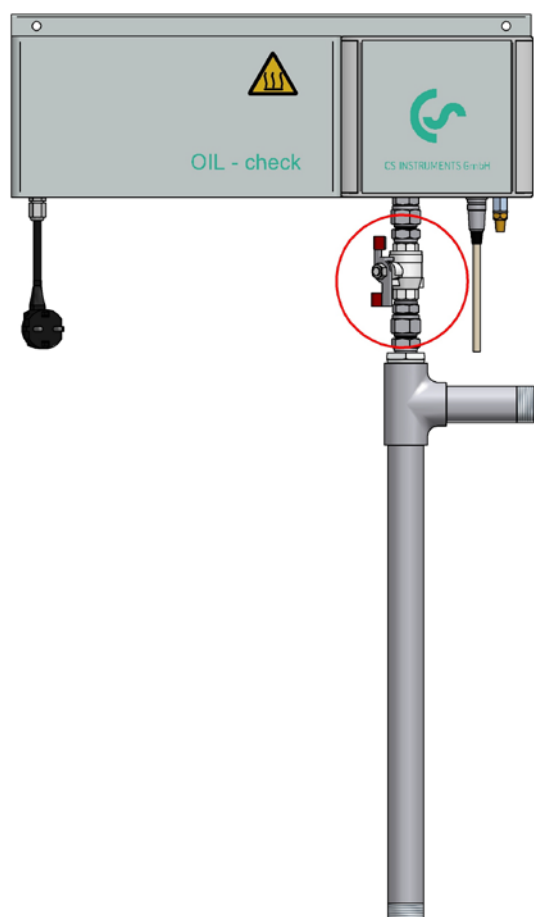
The diagram shows a rectangular sensor unit (1) with a perforated front panel. A probe (3) is shown being inserted into the front panel. A stationary seal ring (6) is shown being placed on the front panel. A blue circular icon with a white glove symbol is positioned to the right of the diagram.

10. Connect the probe (3) with the sensor unit (1). Please make sure not to damage the second stationary seal ring (6) when doing so.

## Installation of the sensor unit (steps 11 – 14)



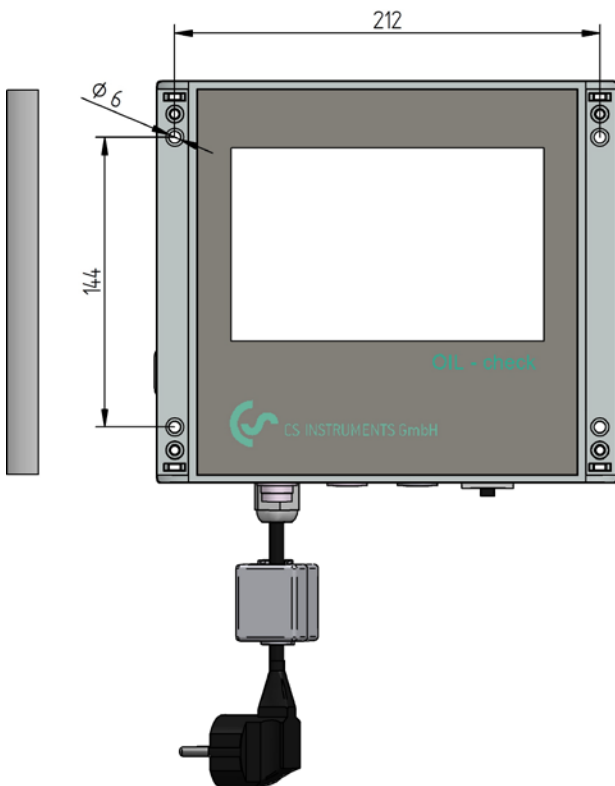
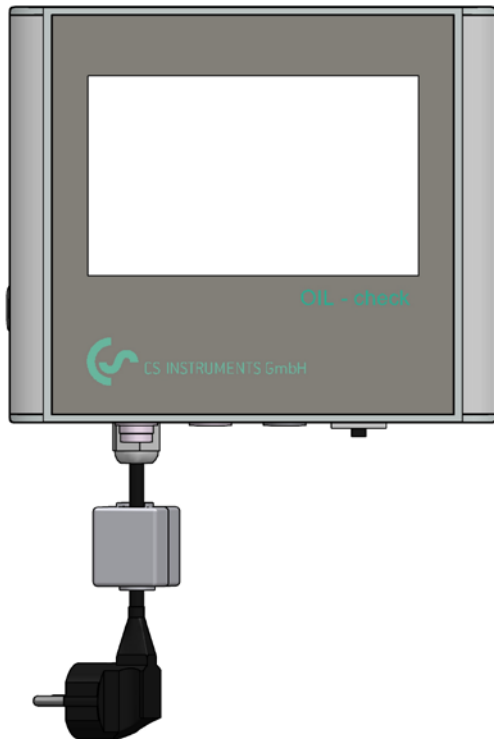
11. Please screw the union nut (4) carefully onto the screw-connection body (5) until the nut is finger-tight.
12. Turn the sensor unit (1) with the probe (3) into the desired position.
13. Now tighten the union nut (4) by means of an SW 22 open-ended spanner with a quarter turn in clockwise direction.
14. Using an SW 24 open-ended spanner which is applied to the screw-connection body (5), you will prevent twisting of the sensor unit (1).

**Option:**

Stainless steel ball valve with wing  
 Connection 3/8"  
 Oil- and grease-free

You will find installation instructions in the Appendix.

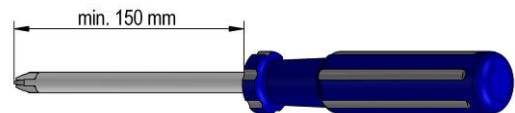
### Installation of the evaluation unit (steps 15 – 19)



15. Determine the place of installation of the evaluation unit, taking into account the available length of the signalling cable.
16. The standard length is 5 m
17. Drill four mounting holes as illustrated here for the respective fitting screws.
18. Prior to mounting the device, the lateral panels covering the screwing zone must be levered out carefully.
19. Fix the housing of the evaluation unit on the wall in the vicinity of the probe. For this purpose, use the four through bores  $\varnothing 6$  mm.

You will find a hole director in the Appendix to these operating instructions.

Make sure that a screwdriver with a sufficiently long shaft is available.



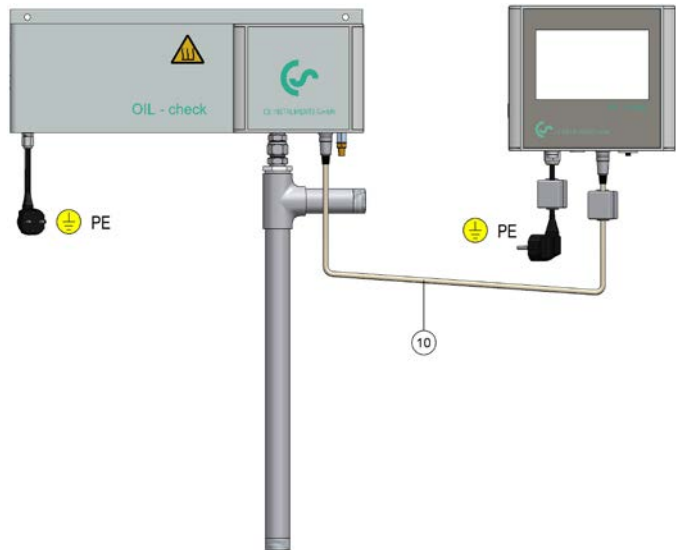
#### **WARNING!**

#### **Unauthorised intervention!**

Unauthorised interventions may endanger persons or plants and lead to a malfunction.

Damaging the sealing of the housings of the sensor unit and the evaluation unit invalidates the warranty.



**Connection of the measuring cell with the evaluation unit (step 20)**


20. Connect the evaluation unit with the sensor unit using the supplied signalling cable (10). The ferrite must be connected on the side of the evaluation unit.

**!**

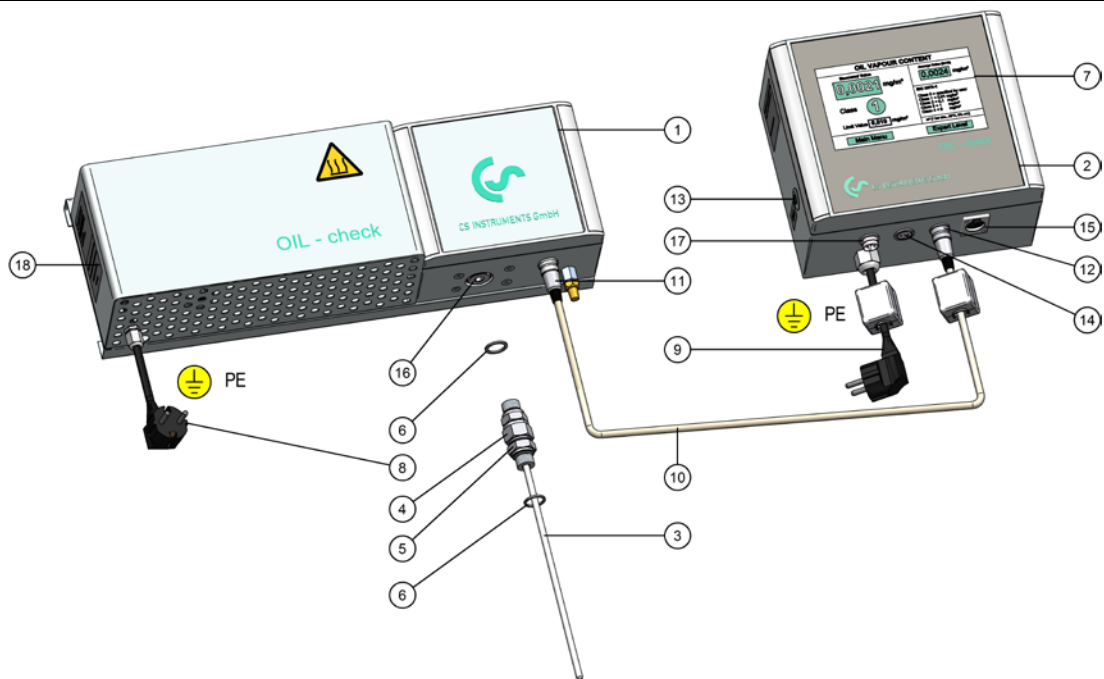
Please make sure prior to connecting the signalling cable that both units are disconnected from the power supply.

**Protection against damage through electrostatic charging**

The device contains electronic components which may be sensitive to electrostatic discharge (ESD). The contact with electrostatically-charged persons or objects compromises these components. In the worst case, they are immediately destroyed or will fail subsequent to the start-up.

Observe the requirements stipulated in EN 100015-1 to minimise or prevent the possibility of damage through sudden electrostatic discharge. Please also make sure not to touch the electronic components while supply voltage is applied.

## Connections for the remote transmission of data and alarm signals (steps 21-22)



21. Connect the potential-free alarm contact to position 19 (see Appendix).
22. Should you so wish, connect your PC via the Ethernet port 15.  
If required, use the analogue output 4-20 mA (position 14).

## Connection of the evaluation unit to the power supply (step 23)



### DANGER!

#### Supply voltage!

Contact with non-insulated parts carrying supply voltage involves the risk of an electric shock resulting in injuries and death.

The connection to the electric mains and the corresponding protective equipment must comply with the legal provisions in force at the place of installation of the OIL CHECK; the connection and installation must be carried out by specialists who are qualified accordingly.

Make sure that no parts of the measuring devices are energised and that the devices cannot be connected with the electric supply mains during service measures.



### DANGER!

#### Missing earth connection!

When the earth connection (protective earth) is missing, there is the risk in the event of malfunction, that contactable, conductive components may carry supply voltage. Touching of such parts leads to an electric shock with injuries and death.

It is imperative to connect the plant to earth or to connect the protective conductor according to the regulations.

Do not use plug adapters at the power plug.

Have the power plug replaced by qualified skilled persons, if required.

**DANGER!****Missing separator!**

All voltages representing a hazard when coming into contact with them must be disconnectable via assigned separators that need to be installed externally.

The separator must be installed in the vicinity of the device.

The separator needs to correspond to IEC 60947-1 and IEC 60947-3.

The separator must separate all voltage-carrying conductors.

The separator must not be installed in the power supply line.

The separator must be easily accessible for the user.



Prior to establishing the connection with the electric mains, the housing of the evaluation unit with user interface (display) and the sensor unit must be connected with the supplied signalling cable!

**11 Start-up****NOTE!****Exceeding of the operating data!**

Make sure that the operating parameters comply with the data indicated on the type plate and in the operating instructions of the OIL CHECK (voltage, frequency, air pressure, pressure dew point, air temperature, ambient temperature, etc.).

All OIL CHECK measuring devices are carefully tested and controlled prior to delivery. For this purpose, the actual operating conditions are simulated. Apart from this, it can happen that the measuring device is damaged during the transport. Therefore, we recommend you examine the specified function of the OIL CHECK in detail subsequent to delivery and during the first hours of operation.



The start-up must be carried out by qualified and authorised skilled persons.



It is vital that the technician carrying out the start-up uses safe tools and that he proceeds in accordance with the local safety and accident prevention regulations. The technician is responsible for the proper and safe operation of the OIL CHECK. The OIL CHECK must not be started up while the housing covers are removed or open.

Please observe the following advice during the first start-up, each time after a longer downtime, or subsequent to maintenance or calibration. The initial start-up or the re-start must only be carried out by qualified and authorised skilled persons.

**DANGER!****Supply voltage!**

The connection to the electric mains and the corresponding protective equipment must comply with the legal provisions in force at the place of installation of the OIL CHECK; the connection and installation must be carried out by specialists who are qualified accordingly.

### 11.1 General advice regarding the installation

Please observe prior to installation:

- Comply with the following admissible operating conditions:
  - Operating pressure
  - Compressed-air and ambient temperature
  - Moisture content of the compressed air
  - Location.
- Connect suitable filters ahead to ensure the cleanliness of the operating medium.
- Observe the installation position (see Chapter 5).
- Observe the permissible deviation of the supply voltage.
- Remove dirt from the pipes prior to the installation of the OIL CHECK.
- Proceed in the described order when starting up a OIL CHECK.

#### 1. Mechanical installation

- Make sure that all advice given under "installation" was observed.
- Make sure that the compressed-air connections and all conduit pipes are securely screwed.

#### 2. Preparation OIL CHECK

- Please make sure that the OIL CHECK device was stored approximately three hours prior to installation at the place of installation so as to allow the temperature adaption to the ambient temperature. During this period, the sensor unit must not be connected to the power supply.

#### 3. Electrical installation

- Make sure that the connection between the evaluation unit with user interface (display) and the sensor unit was established with the supplied signalling cable.
- Establish the connection with the power supply (sensor unit and evaluation unit).
- Make sure to switch on the power supply of the sensor unit and the evaluation unit.
- **The reference gas generation system requires a pre-heating time of approx. two hours. Only after this pre-heating time has expired may compressed air flow through the OIL CHECK.**
- Insufficient pre-heating of the reference gas generation system would result in unstable measured values.
- The power plugs serve as a separation line. In this function, they must be freely accessible at all times.

#### 4. Loading with operating medium

- Slowly open the air inlet valve and slowly pressurise the pipe. Otherwise, the device can be damaged.
- Check the system for its tightness!

**5. Settings (see Chapter 10.2, page 38 and Chapter 10.3, page 45)**

- Choose the oil or the gas type
- Set the alarm value
- Start measurement

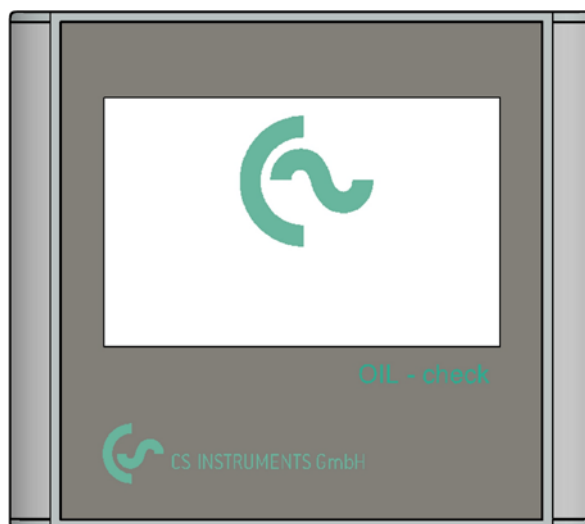
**6. Normal operation**

### 11.2 Procedure settings

This chapter as well as the following chapters describe the required settings, how the settings are implemented and which messages may appear on the display.

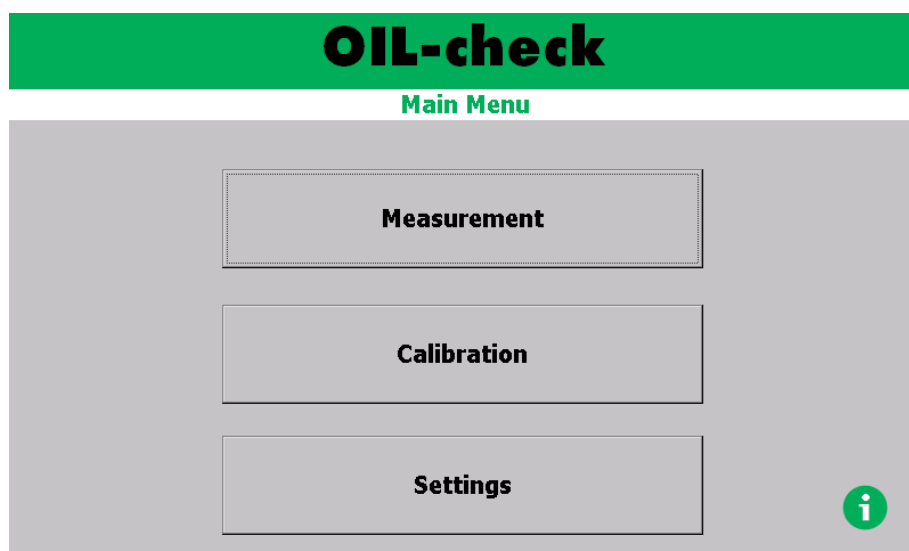
Furthermore, you will find advice and recommended actions regarding the settings to be chosen.

Subsequent to switching-on the power supply of the evaluation unit, the operating system requires approx. 30 seconds to start the system. The following start screen will appear:



Subsequently, the device will switch over to the main menu. You can now make all required settings. For this purpose, please follow the procedure on the next pages.

### Using the password



To get access to several selection and setting levels of the OIL CHECK, it is necessary to enter a password.

If the password needs to be entered, the following selection box will appear on the display:

The screenshot shows the 'OIL-check' Main Menu. A central dialog box titled 'Enter Password' is displayed. It contains a green input field and an 'OK' button. Below the dialog box is a numeric keypad with buttons for digits 0-9, a decimal point, and a backspace key. The 'OK' button is highlighted in the bottom right corner of the keypad.

- Enter the password "**04321**".
- Confirm with "OK" in the selection window.
- Confirm with "OK" below the password.

Subsequently, the selected submenu will open and you may continue with your selection/settings.

### Main menu

Firstly, please choose "**SETTINGS**".

The screenshot shows the 'OIL-check' Main Menu. Three large buttons are visible: 'Measurement', 'Calibration', and 'Settings'. The 'Settings' button is highlighted. An information icon (i) is located in the bottom right corner.

**AUTOSTART**☒ **Autostart Measurement**

Always select "Autostart". When choosing this function, measurement will begin automatically with the selected and adjusted values at the start or re-start of the device.

After an interruption of the power supply, for example, an autostart takes place after 42 seconds. In this case, the pre-adjusted values are retrieved for measurement.

☒ **Compressor Oils**

Choose the oil type used in your compressor. Should this oil type not have been entered, please choose between

- mineral oil and
- synthetic oil
- 

## OIL-check

### Settings

Autostart	DateTime	Network	TouchScreen	Update	Service	ScientificMode	4-20 mA
-----------	----------	---------	-------------	--------	---------	----------------	---------

☒ **Autostart Measurement**

☒ **Compressor Oils**  
**Shell S 46 ISO 8573-1**

☐ **Other Hydrocarbons**  
**Isobuten DIN 1343**

OK

Cancel



## DATE AND TIME

After having adjusted the date and time, please click on "Set".

A click on OK does not lead to the storage of date and time (as the only exception), as it is not foreseeable, how long the user will stay in the menu after the setting.

The screenshot shows the 'OIL-check' application window with the 'Settings' tab selected. The 'DateTime' sub-tab is active. It features a date dropdown menu showing '2/27/2013', two time dropdown menus showing '9' and '12' separated by a colon, and a 'Set' button. At the bottom right are 'OK' and 'Cancel' buttons.

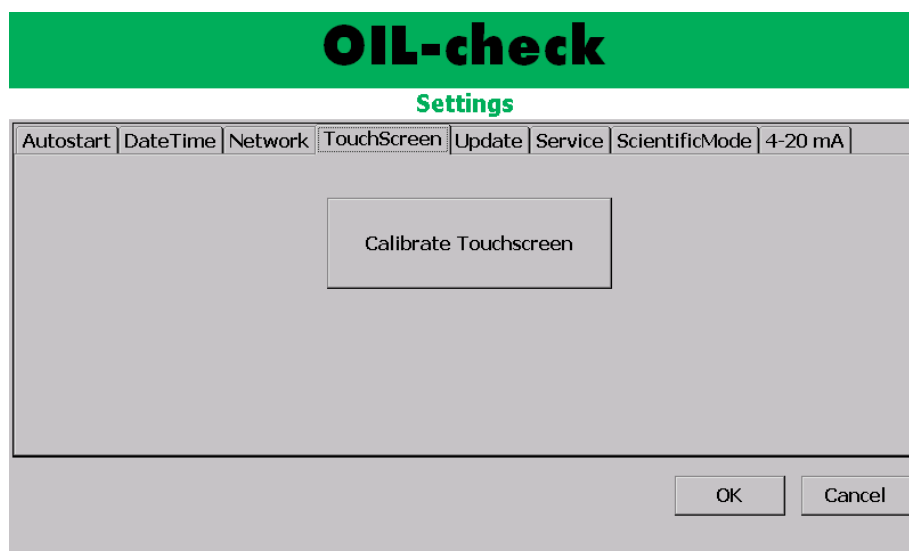
## NETWORK

Mark the selection box "Automatic (DHCP)", for example. For further settings, please observe our separate instructions.

The screenshot shows the 'OIL-check' application window with the 'Settings' tab selected. The 'Network' sub-tab is active. It displays two radio buttons: 'Automatic (DHCP)' (selected) and 'Manual'. Below these are four text input fields for 'IP Address' (192.168.1.165), 'Subnet Mask' (255.255.255.0), 'Gateway' (192.168.1.1), and 'DNS Server' (192.168.1.1). To the right, there is a yellow informational box with text about DHCP and security restrictions, and a 'MAC Address' field containing '00-50-C2-AD-C1-D1'. At the bottom right are 'OK' and 'Cancel' buttons.

## TOUCHSCREEN (USER INTERFACE)

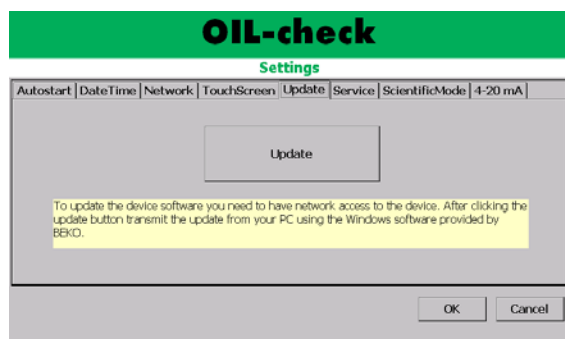
Click on "Calibrate Touchscreen" and follow the instructions on the display.



## UPDATE

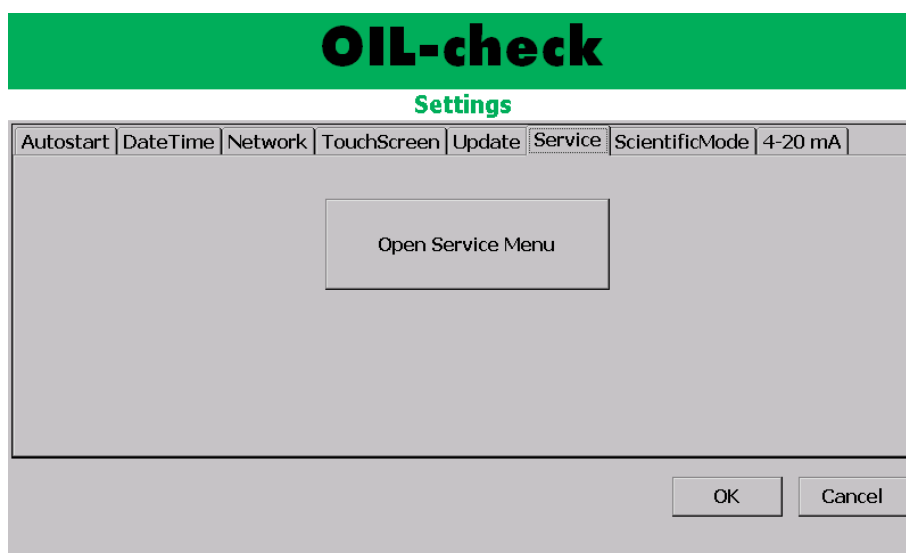
To install a new software version, the device must be connected with a PC/notebook via the network tap and the Windows software started on a PC/notebook.

- Click on "Wait for Update" at the device
- Choose the respective device on the PC and start the update
- Wait until the message appears at the device informing you that the update has been completed.



**SERVICE**

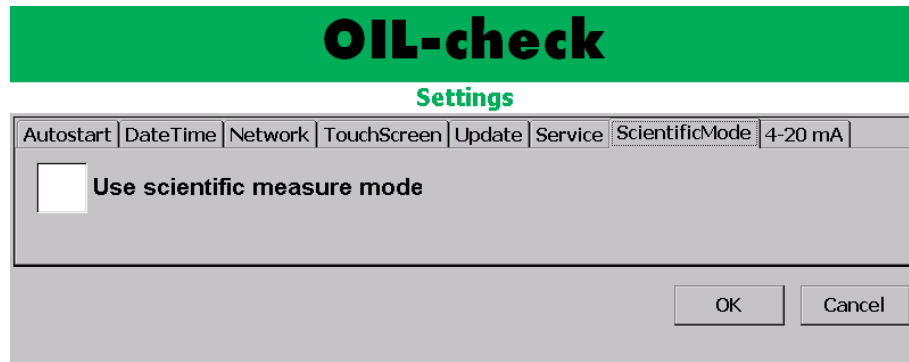
This menu item is protected with a password. Access is only allowed to CS INSTRUMENTS service or to authorised skilled personnel.



## SCIENTIFIC MODE (SPECIAL MODE)



Please use this mode only after prior consultation with CS INSTRUMENTS.

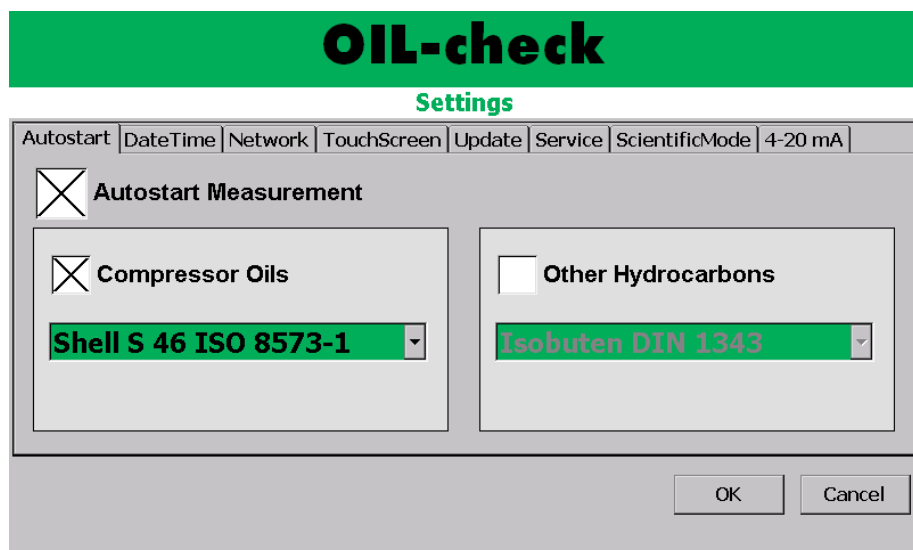
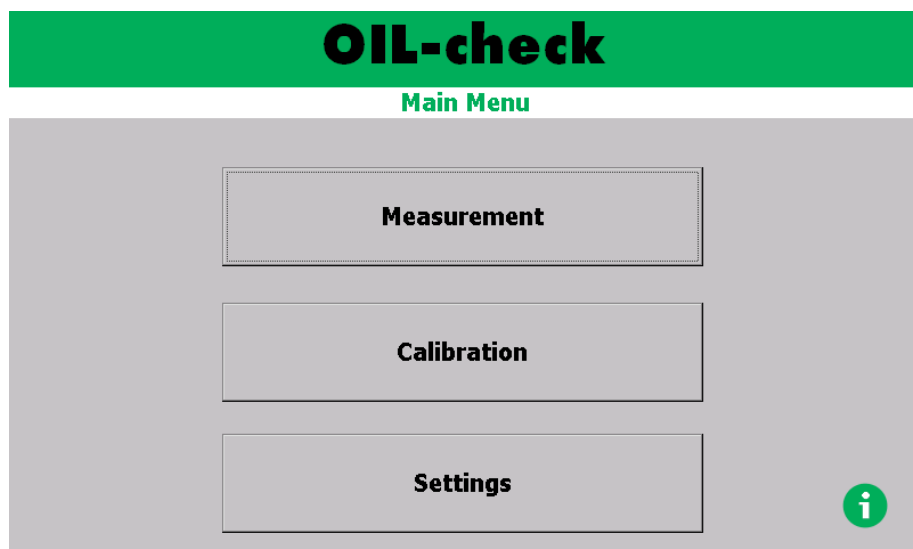


If the scientific mode is activated (Settings ->ScientificMode) a corresponding information will occur.

### 11.3 Procedure start measurement

#### Main menu

Please select the "Measurement" menu item.

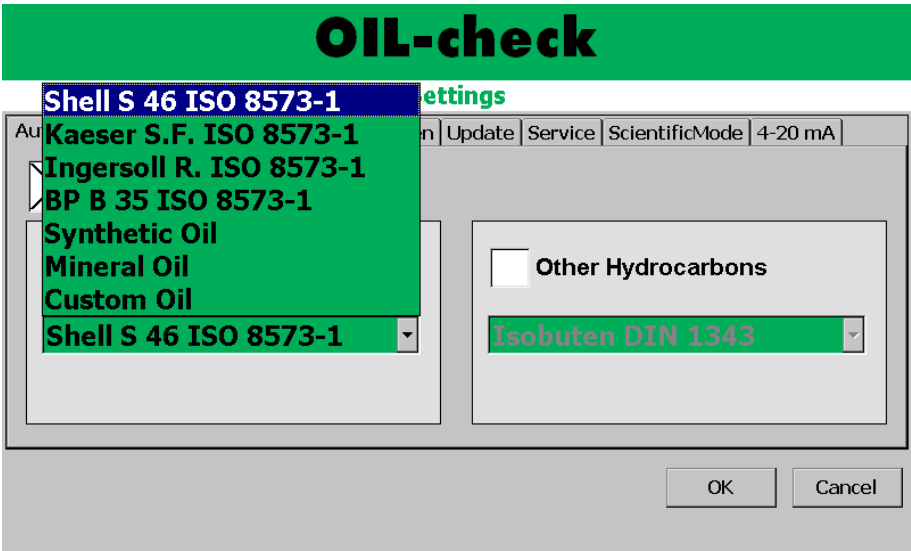


Make your choice between "Compressor Oils" or "Other Hydrocarbons".

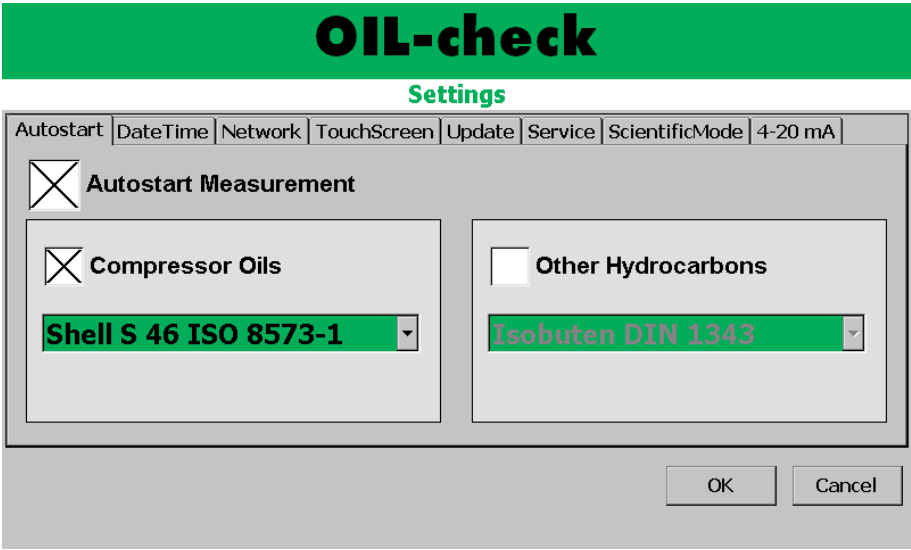
Click on the corresponding substance in the related select list. The other select list is disabled.

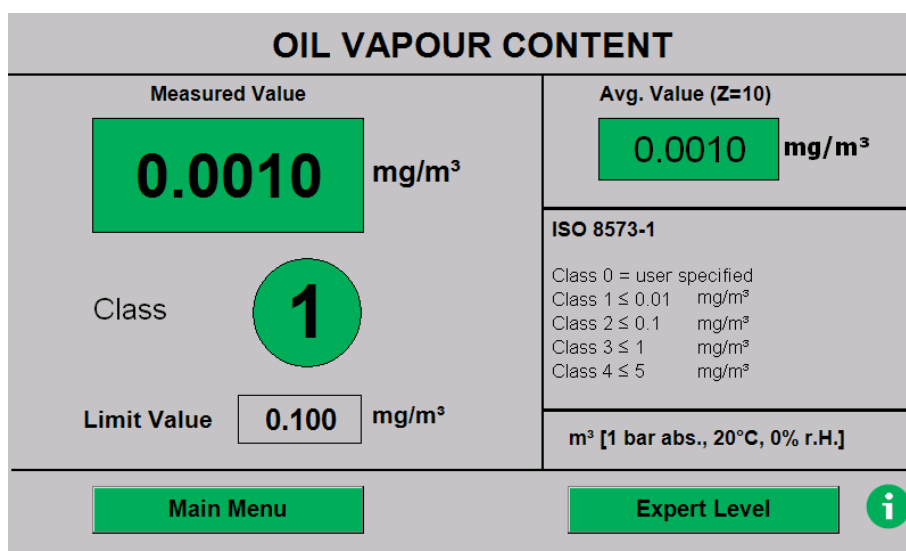
When choosing "Custom Oil", oil with a self-calculated factor can be measured.

When the "ScientificMode" (Settings->ScientificMode) is activated, a corresponding warning is shown.



Click "Start" to start the measurement.



**NOTE!**

OIL CHECK operates fully automatically. Only after the first measuring cycle has expired (at the latest after five minutes) will the device indicate measured values. Subsequently, the values on the display will reload automatically every two minutes.



At this point, important details regarding the device and the device configuration are available which are required during service measures.

# OIL-check

## Device Info for OIL-check\_465

VERSION=1.9.6.2	WREF=60000	LIN=False
IP=192.168.1.165	WMEAS=60000	LMODE=Pow
DHCP=False	CF=1	LFR1A=0
DATE=2013/2/27 09:17	SF=69.24	LFR1B=1
ALARM=0.1	USEROFF=True	LFR1C=0
LIVELOG=False	ROFF=0.024	LFR2A=0
DEVICEID=465	SCIENT=False	LFR2B=1
MANDATE=0113	GAIN=8	LFR2C=0
	OVR=8	LFR3A=0
	OH=526.13	LFR3B=1
	NN=8760	LFR3C=0
	AOUT=True	LFT12=0.005
		LFT23=0.05

OK



**Setting / modification alarm value**

To modify the alarm value, proceed as follows:

- Click on the display field of the adjusted limit value to modify it in accordance with your requirements.
- Click on the alarm value. A selection window with digits, CLEAR and OK will appear.

OIL VAPOUR CONTENT	
<b>Measured Value</b> <div style="background-color: green; color: black; padding: 10px; font-size: 24px; text-align: center;">0.0010</div> <b>mg/m<sup>3</sup></b>	<b>Avg. Value (Z=10)</b> <div style="background-color: green; color: black; padding: 10px; font-size: 24px; text-align: center;">0.0010</div> <b>mg/m<sup>3</sup></b>
<b>Class</b> <div style="background-color: green; color: black; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; font-size: 24px; margin: 10px auto;">1</div>	<b>ISO 8573-1</b> Class 0 = user specified Class 1 ≤ 0.01 mg/m <sup>3</sup> Class 2 ≤ 0.1 mg/m <sup>3</sup> Class 3 ≤ 1 mg/m <sup>3</sup> Class 4 ≤ 5 mg/m <sup>3</sup>
<b>Limit Value</b> <div style="border: 1px solid black; padding: 5px; display: inline-block;">0.100</div> <b>mg/m<sup>3</sup></b>	<b>m<sup>3</sup> [1 bar abs., 20°C, 0% r.H.]</b>
<div style="background-color: green; color: black; padding: 5px; text-align: center; width: 100px;">Main Menu</div>	<div style="background-color: green; color: black; padding: 5px; text-align: center; width: 100px;">Expert Level</div> <div style="background-color: green; color: white; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-left: 10px; font-size: 12px;">i</div>

- Enter the password "04321".
- Confirm with OK in the selection window.
- Confirm with OK below the password.

OIL VAPOUR CONTENT															
<b>Measured Value</b> <div style="background-color: green; color: black; padding: 10px; font-size: 24px; text-align: center;">0.0000</div> <b>mg/m<sup>3</sup></b>	<b>Avg. Value (Z=10)</b> <div style="background-color: green; color: black; padding: 10px; font-size: 24px; text-align: center;">0.0000</div> <b>mg/m<sup>3</sup></b>														
<b>Class</b> <div style="background-color: green; color: black; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; font-size: 24px; margin: 10px auto;">0</div>	<b>ISO 8573-1</b> = user specified ≤ 0.01 mg/m <sup>3</sup> ≤ 0.1 mg/m <sup>3</sup> ≤ 1 mg/m <sup>3</sup> ≤ 5 mg/m <sup>3</sup>														
<b>Limit Value</b> <div style="border: 1px solid black; padding: 5px; display: inline-block;">0.100</div> <b>mg/m<sup>3</sup></b>	<b>m<sup>3</sup> [1 bar abs., 20°C, 0% r.H.]</b>														
<div style="background-color: green; color: black; padding: 5px; font-weight: bold;">Enter Password</div> <div style="border: 1px solid black; padding: 10px; margin: 5px auto; width: 150px;"> <div style="background-color: green; color: black; padding: 2px 10px; margin-bottom: 5px;"></div> <div style="text-align: center; margin-top: 5px;">OK</div> </div>															
<table border="1" style="width: 100%; text-align: center; font-size: 16px;"> <tr> <td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>.</td><td>&lt;-</td></tr> <tr> <td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>CLEAR</td><td>OK</td></tr> </table>		0	1	2	3	4	.	<-	5	6	7	8	9	CLEAR	OK
0	1	2	3	4	.	<-									
5	6	7	8	9	CLEAR	OK									

- Click on the alarm value.
- 

**OIL-check**

Set Limit Value

Limit Value

Limit Value

0.1 mg/Nm<sup>3</sup>

OK Cancel

- An input field with digits, CLEAR and OK opens.

0	1	2	3	4	.	<-
5	6	7	8	9	CLEAR	OK

- Click on CLEAR to delete the previous alarm value.
- Enter the new alarm value.
- Click on OK in the input field.
- The window will close.
- Confirm the adjusted alarm value with OK.

Measurement will not be interrupted by these setting measures.

## 12 Removal from service and uninstalling

The removal from service and uninstalling of the OIL CHECK is implemented in reverse order to the installation and start-up.



### NOTE!

First, make sure that all devices are separated from the power supply and that the pipework is pressureless!

## 13 Operation



The device must only be operated by correspondingly qualified and authorised operators.



Opening of the sensor unit and improper treatment are not allowed.

Have system performance checks, setting and service measures exclusively carried out by authorised skilled personnel<sup>2</sup>.

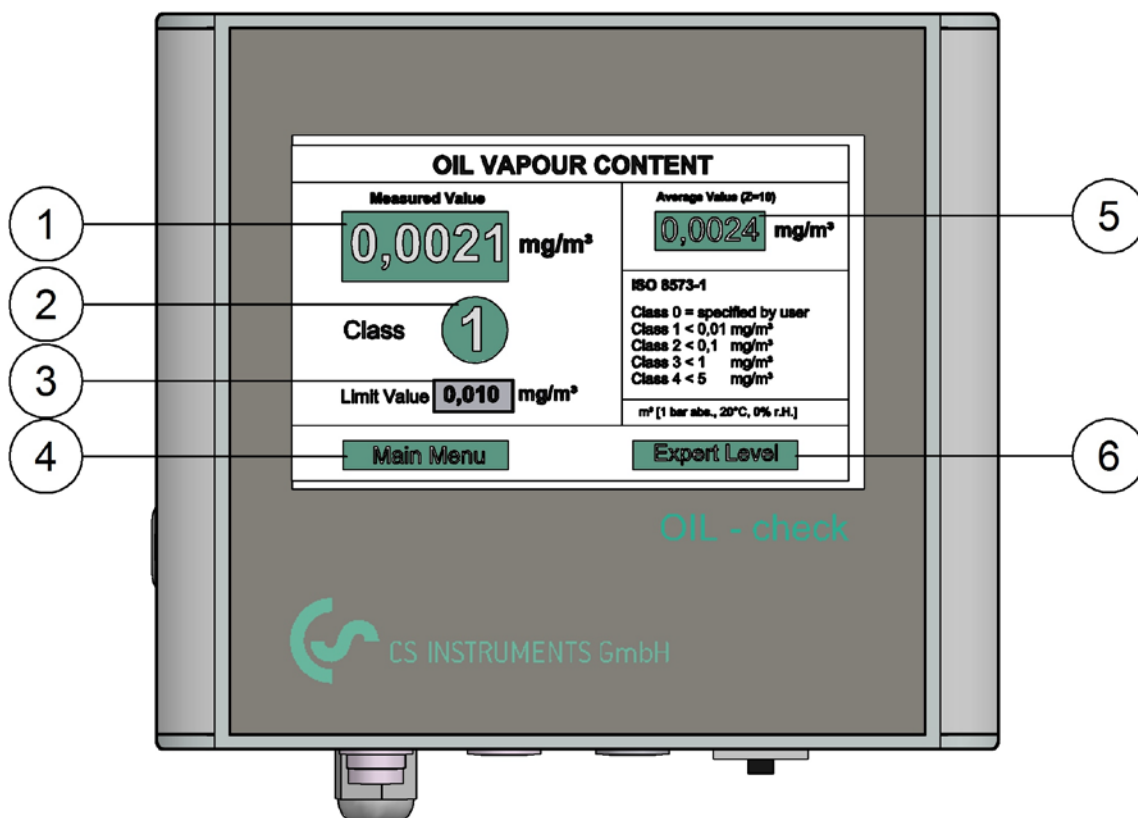


Calibration works can only be implemented by CS INSTRUMENTS service.

---

<sup>2</sup> Authorised skilled personnel are persons who are authorised by the manufacturer, with experience and technical training, who are well-grounded in the respective provisions and laws and capable of carrying out the required works and of identifying and avoiding any risks during the machine transport, installation, operation and maintenance. Qualified and authorised operators are persons who are instructed by the manufacturer regarding the handling of the OIL CHECK, with experience and technical training, and who are well-grounded in the respective provisions and laws.

### 13.1 Control and display elements



- 1 - Indication current measured value
- 2 - Indication classification residual oil content in accordance with ISO 8573-1
- 3 - Indication adjusted alarm value
- 4 - Selection box for main menu
- 5 - Indication of the mean measured value of the past 10 measurements
- 6 - Selection box for service level

### 13.2 General advice for the operation of the OIL CHECK

1. A lack of throughflow can lead to an increase in the residual oil content values.
2. When the system is unpressurised or when there is no compressed-air throughflow, this will be signalled. The screen is red and displays a warning regarding the cause of malfunction, as well as measures for the elimination of faults (see Chapter 12.3).
3. The power supply of the sensor unit must always be connected. Only in this manner can it be guaranteed that the reference gas generation system functions reliably.
4. Read out the measured values of the device at regular intervals of the device's memory by means of the software. Check these values with regard to temporary exceeding of the limit value.
5. The indication of the measured value is updated every two minutes. During this time, measurement continues in the background.
6. Total reset of the device can only be effected through interruption of the power supply.

**Please make sure that temperature variations during the operation of OIL CHECK are not too strong (or even exceed the admissible temperature range).**

The following operating conditions are monitored and indicated on the display as clear text:

- Operating pressure too low
- Measurement range exceeded
- Calibration required
- Sensor test required

You will find the respective indications regarding the aforementioned operating conditions in Chapter 12.3.

### 13.3 Trouble indications, service indications and note fields

If the OIL CHECK is operated at inadmissible operating conditions, or if service measures are due, for example, the following communication fields can appear on the display:

- Note fields
- Trouble indications
- Alarm indications

These indications also include the corresponding recommended actions. Please carry out the described operations. Should this not be successful, please contact the CS INSTRUMENTS service which is responsible for you. You will find contact information at [www.cs-instruments.com](http://www.cs-instruments.com) or on page 2.



Have system performance checks, setting and service measures exclusively carried out by authorised skilled personnel<sup>3</sup>.

Calibration works can only be implemented by CS INSTRUMENTS service.

---

<sup>3</sup> Authorised skilled personnel are persons who are authorised by the manufacturer, with experience and technical training, who are well-grounded in the respective provisions and laws and capable of carrying out the required works and of identifying and avoiding any risks during the machine transport, installation, operation and maintenance. Qualified and authorised operators are persons who are instructed by the manufacturer regarding the handling of the OIL CHECK, with experience and technical training, and who are well-grounded in the respective provisions and laws.

### 13.3.1 Trouble indications

#### **Working pressure too low !**

Please increase the operating pressure.  
For minimum value see manual.

#### **Betriebsdruck zu gering !**

Bitte Betriebsdruck erhöhen.  
Minimaler Wert siehe Betriebsanleitung.

#### **Measurement range exceeded !**

##### **Oil content higher than 5mg/Norm m<sup>3</sup>**

Required procedure:

- Detect and eliminate the cause for the high oil content
- Dismount the sensor unit
- Purge the sensor unit with synthetic Zero Air
- Reinstall the sensor unit and start the measurement
- Please contact the CS INSTRUMENTS Service

For detailed procedure please see the manual.

#### **Messbereich wurde überschritten !**

##### **Ölgehalt größer 5mg/Norm m<sup>3</sup>**

Erforderliche Maßnahmen:

- Ursache für hohen Ölgehalt ermitteln und beseitigen
  - Sensoreinheit demontieren
  - Sensoreinheit mit synthetischer Null-Luft spülen
  - Sensoreinheit montieren und Messung starten
  - Bitte CS INSTRUMENTS Service kontaktieren
- Detaillierte Vorgehensweise siehe Betriebsanleitung.

[www.cs-instruments.com](http://www.cs-instruments.com)

### 13.3.2 Service indications



For the sake of operating safety, the performance of the sensor technology is constantly checked during the measurements. In the event that a defined safety limit value has not been reached, an alarm will be activated, informing the user that the device needs to be checked by CS INSTRUMENTS. The following clear text will appear:



The maintenance and calibration interval is determined by the operator of the measuring device. You will find information in this regard in Chapter 14.3. The UV light source will be checked within the scope of the scheduled maintenance and calibration.





At this point in the main menu, important details regarding the device and the device configuration are available which are required during service measures.

OIL-check		
Device Info for OIL-check_465		
VERSION=1.9.6.2 IP=192.168.1.165 DHCP=False DATE=2013/2/27 09:17 ALARM=0.1 LIVELOG=False DEVICEID=465 MANDATE=0113	WREF=60000 WMEAS=60000 CF=1 SF=69.24 USEROFF=True ROFF=0.024 SCIENT=False GAIN=8 OVR=8 OH=526.13 NN=8760 AOUT=True	LIN=False LMODE=Pow LFR1A=0 LFR1B=1 LFR1C=0 LFR2A=0 LFR2B=1 LFR2C=0 LFR3A=0 LFR3B=1 LFR3C=0 LFT12=0.005 LFT23=0.05

OK

For the service, the following fields are decisive:

NN = Number of operating hours indicating the next recommended calibration.

AOUT = Analogue output 4-20 mA active / not active

### 13.3.3 Note fields

**ATTENTION !**  
 Use this mode only after having consulted CS INSTRUMENTS.  
 Close the connection for measuring gas „M“.  
 Connect Zero Air to „Z“.  
 Connect measuring gas to „C“.

**ACHTUNG !**  
 Bitte benutzen Sie diesen Modus nur nach Rücksprache mit CS INSTRUMENTS.  
 Messgas-Anschluss „M“ schließen.  
 Null-Luft an „Z“ anschließen  
 Messgas an „C“ anschließen.  
[www.CS-Instruments.de](http://www.CS-Instruments.de)

### 13.4 Measured value memory

All measured values are documented in an internal memory (2 GB) according to date and time and can be read out accordingly (see Chapter 12.6).

Read out the measured values of the device at regular intervals of the device's memory by means of the software. Check these values with regard to temporary exceeding of the limit value.

### 13.5 Display of the alarm message

For the transmission of the alarm signal when the adjusted limit value has been exceeded, the following possibilities are available:

Standard:	Potential-free alarm contact, 230V/AC 5A or 24V/DC 5A Connection potential-free alarm contact (position 14 on page 16)
Option:	Analogue output 4....20 mA Connection analogue output (position 19 on page 16)

#### 13.5.1 Potential-free alarm contact

##### General advice



For reliable alarm indication, the potential-free contact must only be installed and used in accordance with the indications in this chapter.

Non-observance of the installation and operating instructions involves risks for persons and systems.



If you have any queries regarding these instructions, please contact CS INSTRUMENTS.



This chapter applies to OIL CHECK from software version 1.2.9.11 onwards.



##### **DANGER!**

##### **Missing connection with the protective conductor!**

The connection with the protective conductor must be ensured before establishing an electrical connection with the electric circuit of the potential-free contact.

Prior to removing the power plug of the device, de-energise the potential-free contact.

The removal/plugging-in of the plug for the potential-free contact while energised is not permissible. Voltage must only be supplied to the plug when plugged in.



##### **DANGER!**

##### **Missing separator!**

All voltages representing a hazard when coming into contact with them must be disconnectable via assigned separators that need to be installed externally.

The separator must be installed in the vicinity of the device.

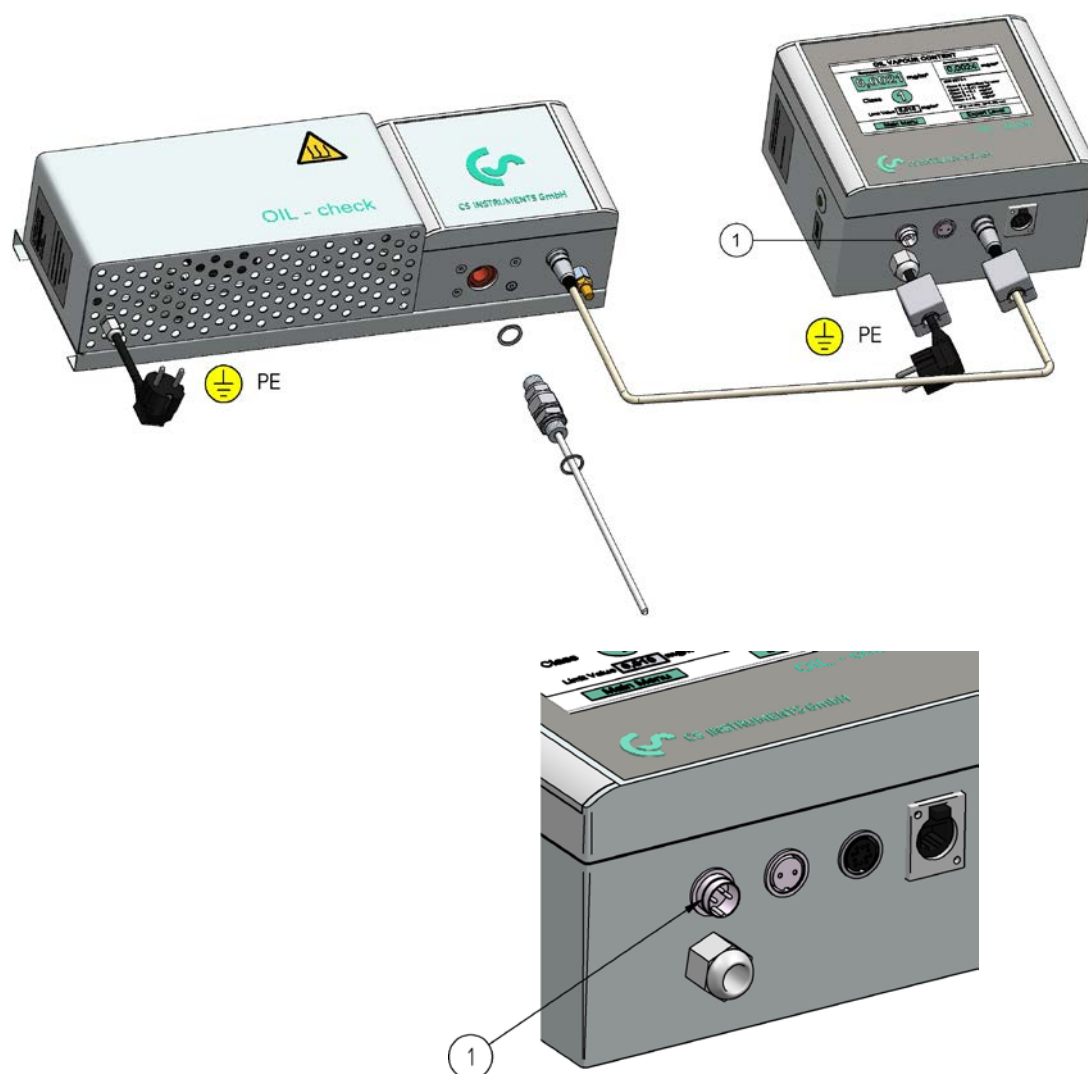
The separator needs to correspond to IEC 60947-1 and IEC 60947-3.

The separator must separate all voltage-carrying conductors.

The separator must not be installed in the power supply line.

The separator must be easily accessible for the user.

The connection for the OIL CHECK alarm contact is at the evaluation unit (1).

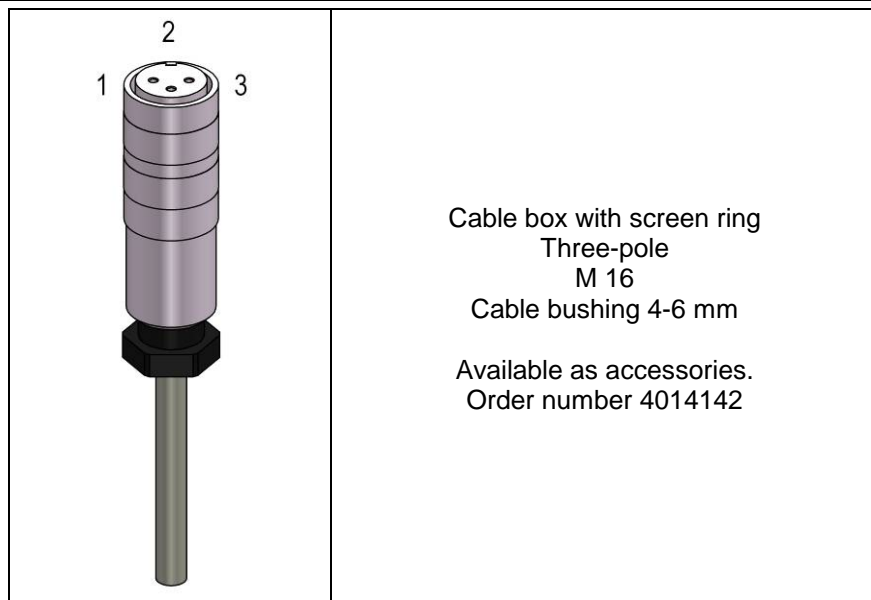


1 - Three-pole male receptacle M 16

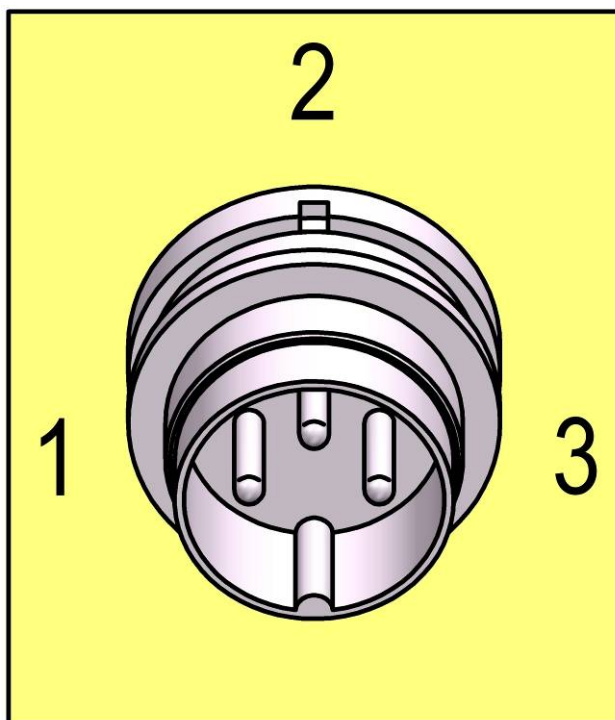
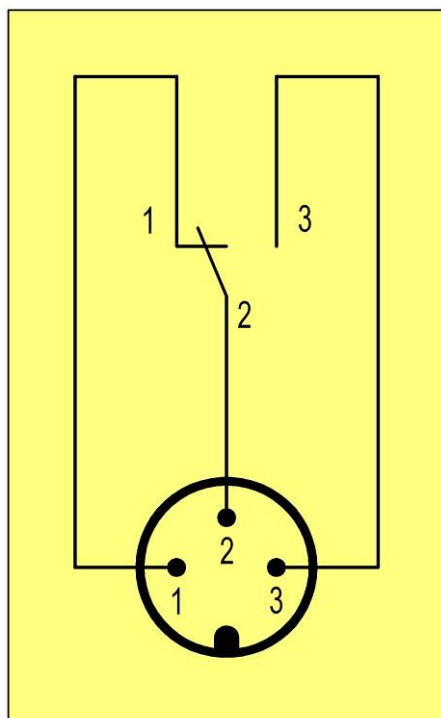
For the transmission of the alarm, a three-pole cable box M 16 can be connected at position (1) at the evaluation unit.



**Plug-and-socket connectors are operating resources that, when properly used (under voltage), must not be plugged-in or disconnected.**

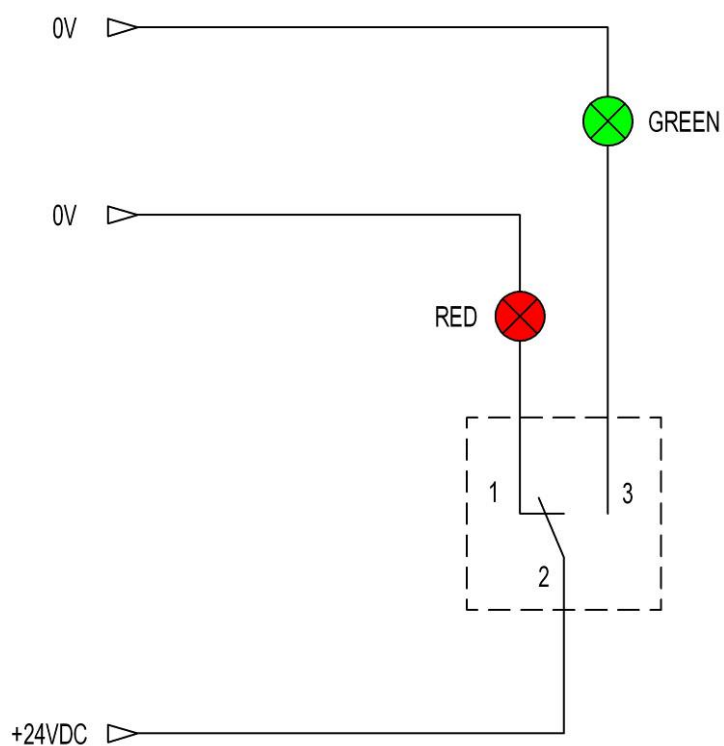


The alarm contact is designed as a potential-free change-over contact.



Maximum load of the contacts:

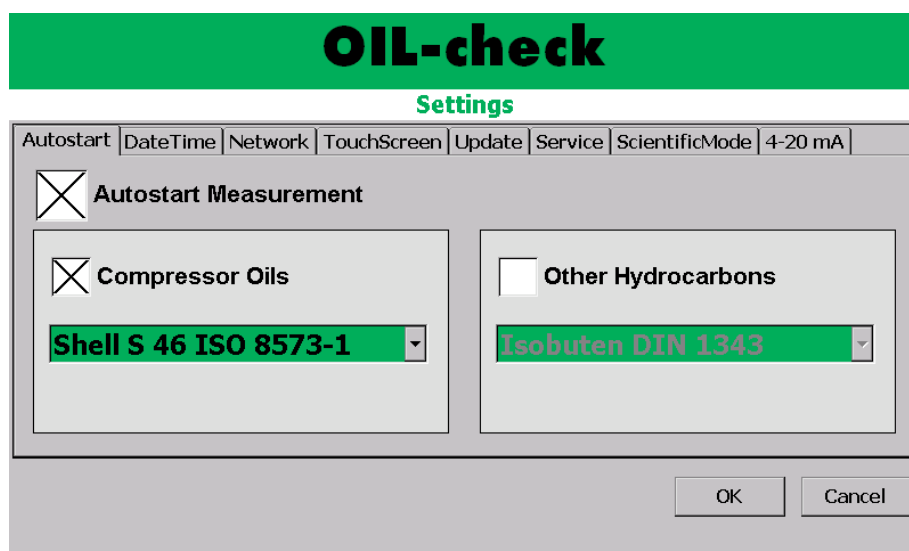
230 VAC = 5 A	ohmic load
24 VDC = 5 A	ohmic load

**Example of a loading of the alarm contact with 24 VDC**

The potential-free alarm contact of the OIL CHECK functions as follows:

## 1. Mode with inactive autostart

See "Settings" menu



Device switched off	Alarm active	
Device switched on	Alarm inactive until the start screen appears	
Start screen	Alarm active	
Start screen without activated autostart	Alarm remains active	
Setting in the "Measurement" menu	Alarm remains active	
Start measurement	Alarm becomes inactive	
Alarm limit value exceeded	Alarm active	
Warning screen pressure too low (no pressure)	Alarm active	
Warning screen measurement range exceeded	Alarm active	
Warning screen sensor test	Alarm active	

## 2. Mode with active autostart

See "Settings" menu

**OIL-check**

Settings

Autostart
DateTime
Network
TouchScreen
Update
Service
ScientificMode
4-20 mA

☒ **Autostart Measurement**









☒ **Compressor Oils**

Shell S 46 ISO 8573-1

☐ **Other Hydrocarbons**

Isobuten DIN 1343

OK
Cancel

Device switched off	Alarm active	
Device switched on	Alarm inactive until the start screen appears	
Start screen	Alarm active	
Autostart of the measurement while the start screen is displayed	Alarm becomes inactive	
Alarm limit value exceeded	Alarm active	
Warning screen pressure too low (no pressure)	Alarm active	
Warning screen measurement range exceeded	Alarm active	
Warning screen sensor test	Alarm active	

## 13.5.2 Analogue output 4-20 mA

### General advice



For safe transmission and indication of the measured values, the analogue output must only be installed and used in accordance with the instructions in this chapter.

Non-observance of the installation and operating instructions involves risks for persons and systems.

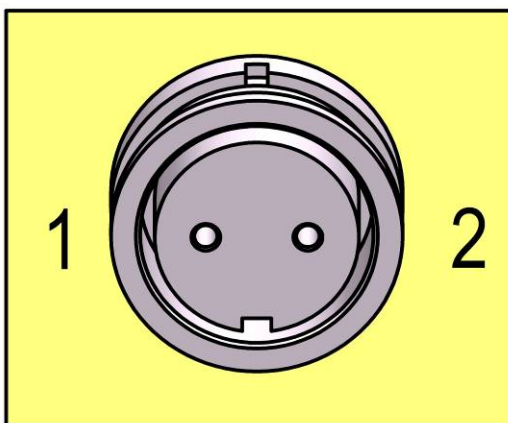
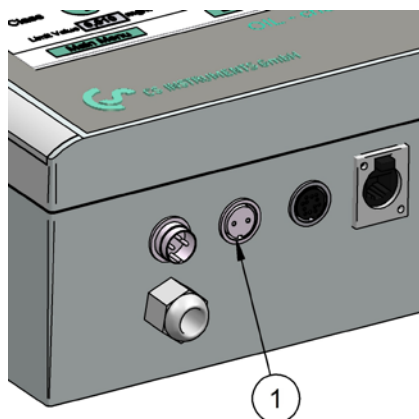
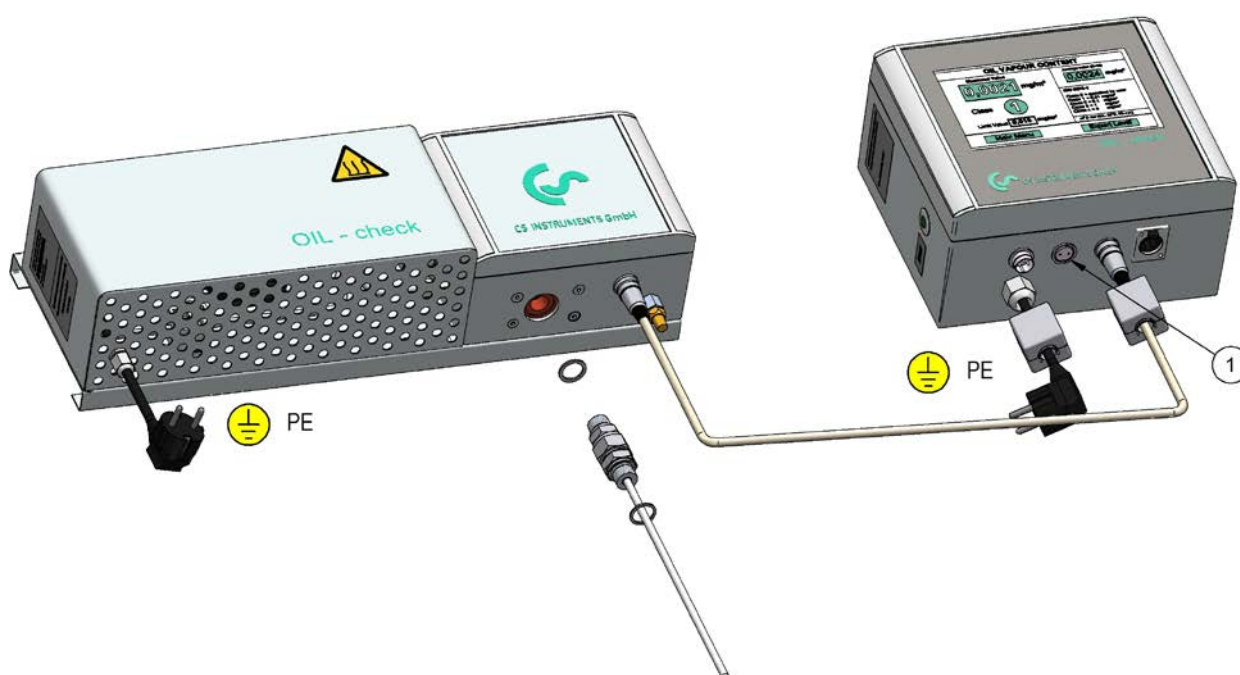


If you have any queries regarding these instructions, please contact CS INSTRUMENTS.



This chapter applies to OIL CHECK from software version 1.3.5.0 onwards.

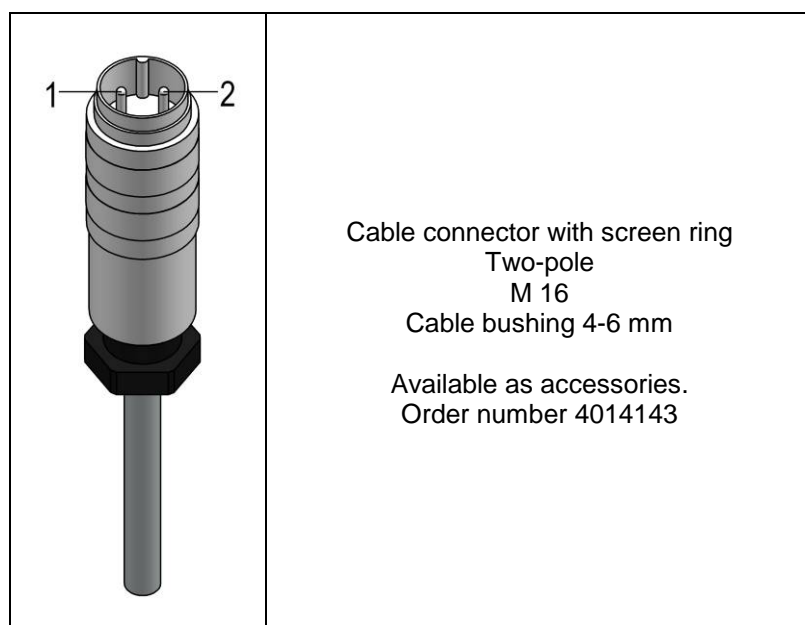
The connection for the OIL CHECK analogue output is at the evaluation unit (1).



- 1 - Two-pole M 16 flange socket for the connection of the 4-20 mA analogue output



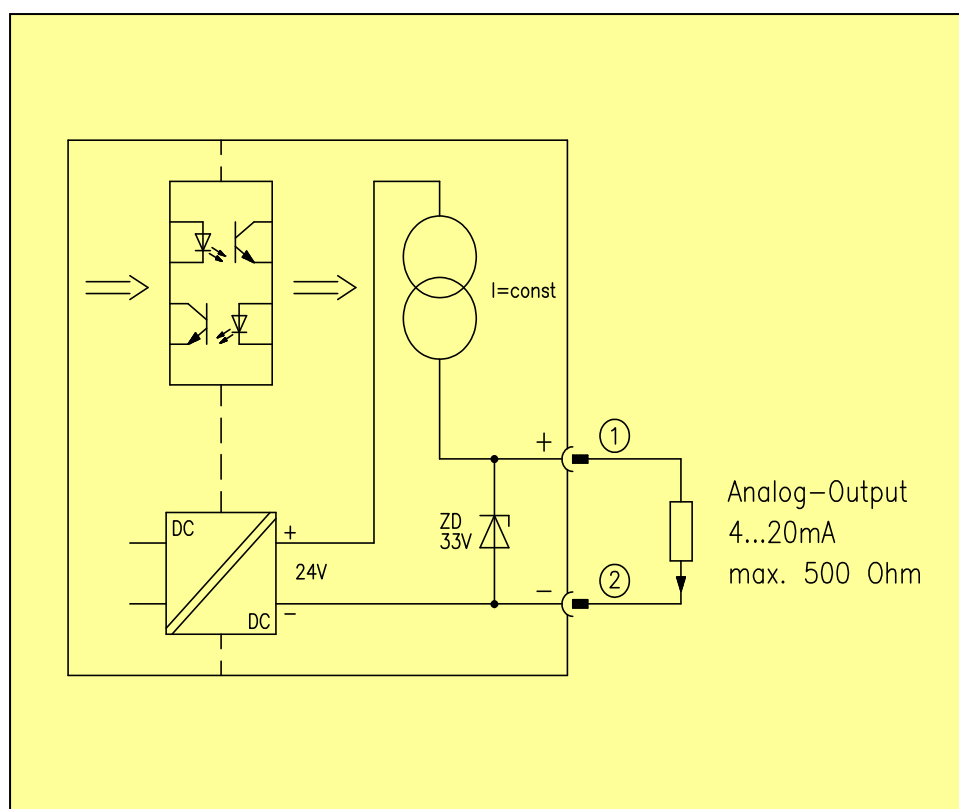
For the transmission of the 4-20 mA signal, a two-pole M16 cable connector can be connected at position (1) at the evaluation unit.

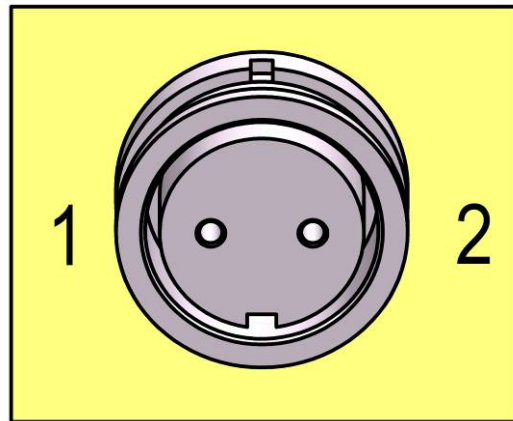
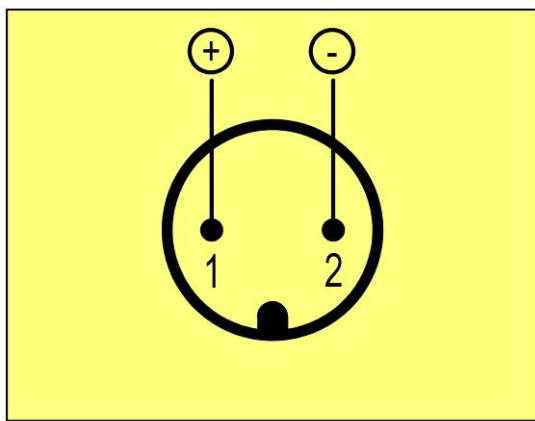


### CAUTION!

The 4....20 mA interface is designed as an **active current source** and is galvanically separated from the rest of the circuit by a 1 kV isolation barrier. The current to be measured depends on the connected load.

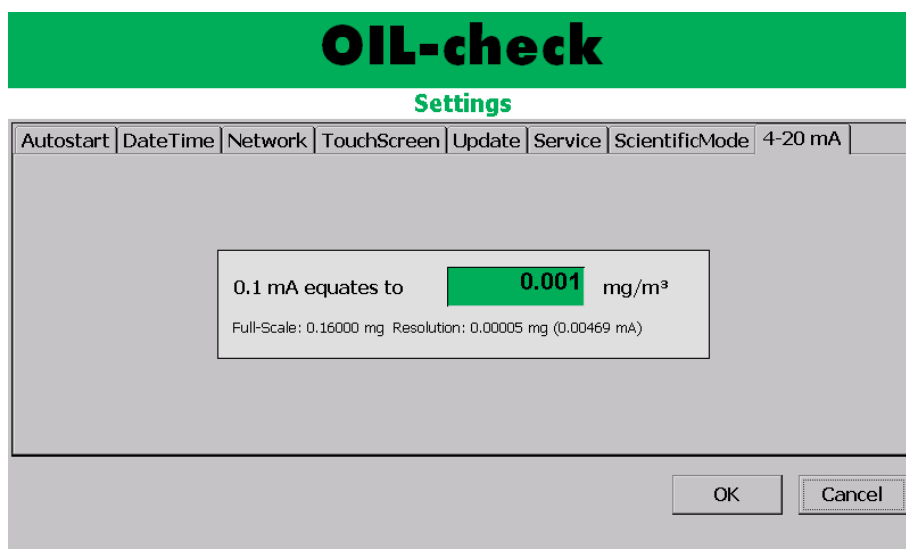
Only a passive current sink is to be connected to the 4....20 mA interface. For correct functioning, the connected load must lie within a range between 0 and max. 500 Ohm.





Flange socket position (1)

In the "**Settings**" menu, the 4-20 mA analogue output can be configured in accordance with your requirements.



To scale the 4-20 mA signal, please proceed as follows:

1. Detect the residual oil content range of your compressed air.
2. Connect the 4-20 mA analogue output to your system.
3. Choose the scaling suitable for your purposes in the "**Settings / 4-20 mA**" menu.

The signal of 4 mA always corresponds to a measured value of 0 mg/m<sup>3</sup>.

"Full-Scale" always denotes the residual oil content at a full-scale deflection of 20 mA.

"Resolution" indicates the resolution of the interface.

**Example setting 1**

If the residual oil content values indicated in the OIL CHECK MEASUREMENT mode lie in the range of  $\leq 0.1 \text{ mg/m}^3$ , please enter "0.001" into the blue field and confirm with OK.

The screenshot shows the 'OIL-check' application with the 'Settings' tab selected. The 'Autostart' tab is active, and the '4-20 mA' option is selected. A central box displays '0.1 mA equates to 0.001 mg/m³' with '0.001' in a blue field. Below this, it states 'Full-Scale: 1.60000 mg Resolution: 0.00047 mg (0.00469 mA)'. At the bottom is a numeric keypad with digits 0-9, a decimal point, and a left arrow, along with 'CLEAR' and 'OK' buttons.

After confirmation with OK, the value for "Full-Scale" and the resolution are indicated. In this example, the following settings are applicable:

Scaling	0.1	mA	corresponds to	0.001	mg/m <sup>3</sup>
Scaling initial value	4.0	mA	corresponds to	0.000	mg/m <sup>3</sup>
Scaling final value (Full-Scale)	20	mA	corresponds to	0.160	mg/m <sup>3</sup>

**Example setting 2**

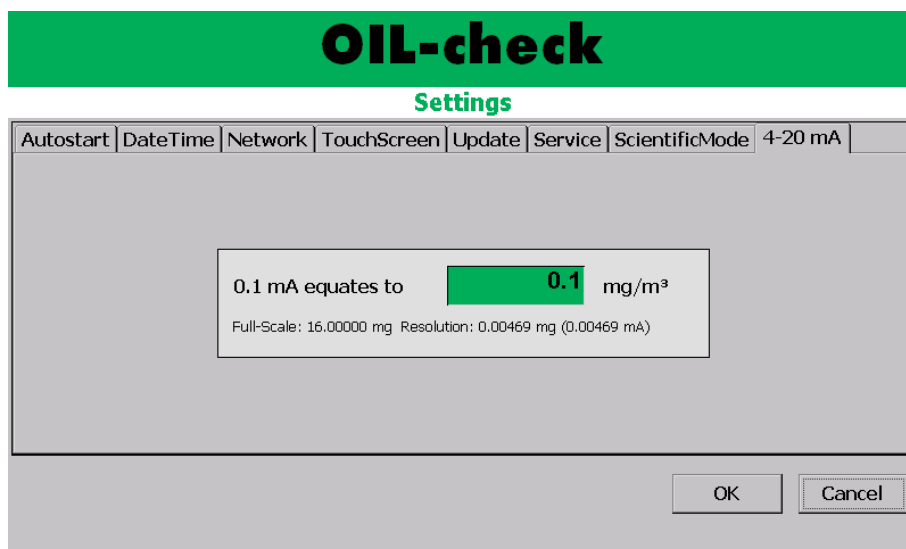
If the residual oil content values indicated in the OIL CHECK MEASUREMENT mode lie in the range between  $\geq 0.1 \text{ mg/m}^3$  and  $\leq 1.0 \text{ mg/m}^3$ , please enter "0.01" into the blue field and confirm with OK.

The screenshot shows the 'OIL-check' application with the 'Settings' tab selected. The 'Autostart' tab is active, and the '4-20 mA' option is selected. A central box displays '0.1 mA equates to 0.01 mg/m³' with '0.01' in a blue field. Below this, it states 'Full-Scale: 1.60000 mg Resolution: 0.00047 mg (0.00469 mA)'. At the bottom right are 'OK' and 'Cancel' buttons.

Scaling	0.1	mA	corresponds to	0.01	mg/m <sup>3</sup>
Scaling initial value	4.0	mA	corresponds to	0.00	mg/m <sup>3</sup>
Scaling final value (Full-Scale)	20	mA	corresponds to	1.60	mg/m <sup>3</sup>

**Example setting 3**

If the residual oil content values indicated in the OIL CHECK MEASUREMENT mode lie in the range between  $\geq 1.0$  mg/m<sup>3</sup> and  $\leq 5.0$  mg/m<sup>3</sup>, please enter "0.1" into the blue field and confirm with OK.



Scaling	0.1	mA	corresponds to	0.1	mg/m <sup>3</sup>
Scaling initial value	4.0	mA	corresponds to	0.0	mg/m <sup>3</sup>
Scaling final value (Full-Scale)	20	mA	corresponds to	16	mg/m <sup>3</sup>

For all other measured-value ranges, the 4-20 mA signal can be scaled using the same steps.

**NOTE!**

Please also check the settings of the 4...20 mA interface at your indicating and evaluation unit and carry out the respective scaling, if required.

Adjust the displayed values at the OIL CHECK and at your indicating unit so that they match.

**Notes**

1. Until the indication of the first measured value, the value which was assigned to the 4 mA is displayed at the start of the measurement.
2. During adjustments at the device (measurement is interrupted) no value is indicated.
3. When the device is deactivated, no values are indicated either.

**13.6 Reading out of the measured values via the Ethernet connection**

See separate operating instructions "OIL CHECK DATA-LOG".

**14 Declaration of conformity****EC declaration of conformity**

We hereby declare that the products indicated hereafter, in the delivered performance, comply with the requirements of the relevant EU directives in force:

Product designation:	<b>OIL CHECK</b>
Voltage options:	110V AC, 230V AC
Min./max. operating overpressure:	3.0 – 16 bar
Product description and function:	Measuring device for the determination of the residual oil content in compressed air and gaseous nitrogen

**Relevant EU directives:**

<b>2006/95/EC</b>	Low-Voltage Directive
<b>2004/108/EC</b>	EMC Directive, electromagnetic compatibility

**Harmonised standards applied:**

<b>EN 61010-1</b>	Safety requirements for electrical equipment for measurement, control and laboratory use
<b>EN 61326-1</b>	Electrical equipment for measurement, control and laboratory use EMC requirements

Year of CE labelling: 2009

The products are labelled with the sign shown below:



This declaration only refers to products in the condition in which they have been placed into circulation. Parts which have not been installed by the manufacturer and / or modifications which have been implemented subsequently remain unconsidered. The safety instructions of the supplied product documentation need to be observed.

Tannheim, 3rd December 2013

**CS Instruments GmbH**

  
Wolfgang Blessing  
**Managing Director / Owner**

## 15 Maintenance and service

The OIL CHECK must be serviced and maintained at regular intervals by authorised skilled personnel. Please have the necessary repair measures only carried out by specialists. Use genuine CS INSTRUMENTS spare parts only.

### 15.1 Care



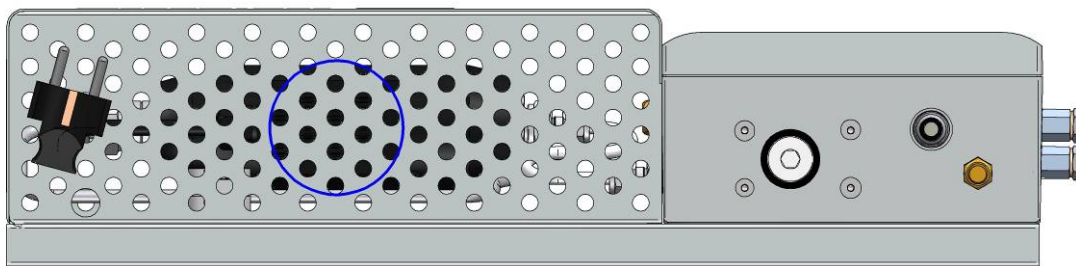
#### NOTE!

Aggressive cleaning agents and solvents must not be used!

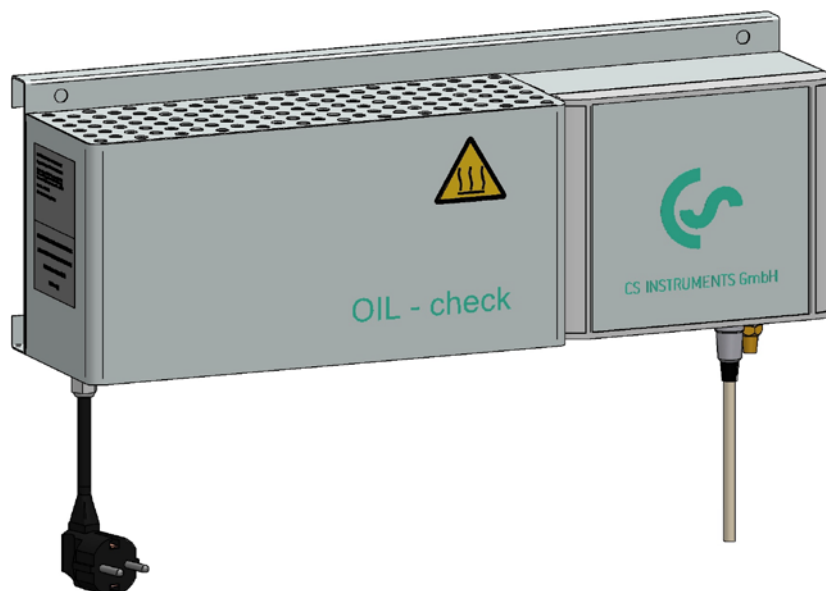
### 15.2 Daily check

Please verify the function of the reference gas generation unit once a day. For this purpose, check whether or not the LED inside the sensor unit flashes (see the area that is marked blue). It may be required to choose an inclined angle of view.

When the LED flashes, the reference gas generation unit is functional. In the event that the LED light remains constant or that the LED is switched off, please immediately contact the CS INSTRUMENTS service.



In addition, the function of the reference gas generation unit is ensured when the left part of the sensor unit shows an increased temperature (can be detected by hand).



### 15.3 Calibration

#### Indications for the determination of calibration intervals for OIL CHECK

The calibration cycle indicates in which time intervals a new calibration (recalibration) is to be carried out. In this respect, the employment conditions of the respective measuring device play a decisive role.

**Generally, the user is responsible for the determination of calibration intervals.** If any instructions exist regarding recalibrations, e.g. in the quality management manual, these periods shall be binding for recalibration.

The decision about how long the calibration interval may be shall therefore be made in consideration of the costs for more frequent recalibrations on the one hand, and for possibly unusable measured values on the other hand.

For certain measurement conditions, such as a high number of operating hours (shift operation), extreme temperature conditions, continuous alternating-load operation, dirt and moisture, calibration will be required at shorter intervals.

The employment conditions also take effect if the **OIL CHECK** device was exposed to strain beyond proper use, meaning that, in such an event, recalibration is required in any case. This includes cases of higher overload, dropping of the unit, extreme temperature conditions, high moisture content in the compressed air and interventions into the device for repair purposes.

By continuously tracking the calibration results, the user will be able to ascertain the typical long-term behaviour of the employed measuring devices and determine the calibration intervals for his employment conditions on this basis, and to extend or reduce these depending on the results.

#### Calibration cycle

At very high demands on the measuring accuracy, we recommend scheduling an interval for recalibration of six or even three months, to begin with. If the measurement properties turn out to be stable after the first or the second recalibration, the calibration interval can be extended to 12 months. A corresponding method for the adjustment (extension or reduction) of the calibration intervals should be a constituent part of the QM system.

Recalibration shall be carried out at the latest 12 months after the OIL CHECK has been delivered.

Please contact the technical service of CS INSTRUMENTS regarding a scheduled recalibration of the OIL CHECK.

### 15.4 Support with regard to any application queries

If you have any technical questions, our technical service and the CS INSTRUMENTS field service will be pleased to help you.

Please always have the serial number of your OIL CHECK ready if you have any queries, as well as the measuring range of the sensor unit (indicated on the type plate at the side of the sensor unit) and the code of the occurred malfunction, if required.

CS INSTRUMENTS will be at your disposal for all queries regarding the compressed-air processing and quality.

Please contact us.

## 16 Appendix

**Table 1 – Minimum flow rate measuring section**

For the exact measurement of the oil content, the sampling manner is of special importance. The sample shall be taken at a point ensuring the presence of a representative and usable mixture of all compressed air components.

As far as gaseous and vaporous organic substances are concerned, it can be assumed that they are sufficiently homogeneously distributed over the measuring cross-section. At a homogenous distribution, the gases can be taken at a defined point approximately in the middle of the measuring cross-section.

For the measuring sections made by CS INSTRUMENTS or for measuring sections which are manufactured according to the specifications of CS INSTRUMENTS, we recommend the following guide values for the minimum flow of the compressed air in the measuring sections, to ensure representative sampling:

Nominal diameter  <i>DN</i>	Thread size  <i>R</i>	EN 10 255 Medium-weight threaded pipes	Minimum flow rate*
<i>DN 10</i>	3/8"	Ø17.2 x 2.3	2.9 m <sup>3</sup> /h
<i>DN 15</i>	1/2"	Ø 21.3 x 2.6	3.7 m <sup>3</sup> /h
<i>DN 20</i>	3/4"	Ø 26.9 x 2.6	5.0 m <sup>3</sup> /h
<i>DN 25</i>	1"	Ø 33.7 x 3.2	6.2 m <sup>3</sup> /h
<i>DN 32</i>	1 1/4"	Ø 42.4 x 3.2	8.2 m <sup>3</sup> /h
<i>DN 40</i>	1 1/2"	Ø 48.3 x 3.2	9.5 m <sup>3</sup> /h
<i>DN 50</i>	2"	Ø 60.3 x 3.6	12.1 m <sup>3</sup> /h
<i>DN 65</i>	2 1/2"	Ø 76.1 x 3.6	15.6 m <sup>3</sup> /h
<i>DN 80</i>	3"	Ø 88.9 x 4.0	18.4 m <sup>3</sup> /h
<i>DN 100</i>	4"	Ø 114.3 x 4.5	23.9 m <sup>3</sup> /h
<i>DN 125</i>	5"	Ø 139.7 x 5.0	29.4 m <sup>3</sup> /h
<i>DN 150</i>	6"	Ø 165.1 x 5.0	35.2 m <sup>3</sup> /h

\* The minimum flow rate is based on standard m<sup>3</sup>/h, in accordance with ISO 1217.

The standard m<sup>3</sup> in accordance with ISO 1217 is based on 1.0 bar abs. and +20°C.



## Installation of the option ball valve between the sampling probe and the sensor unit

When installing the oil- and grease-free ball valve 3/8" for the shut-off of the compressed-air supply to the sensor unit, please observe the following advice:



Die OIL CHECK measuring devices as well as the related accessories must only be installed and used by qualified and authorised skilled personnel and exclusively in accordance with the technical data.



Do not touch the components without oil- and grease-free gloves (textile gloves are recommended) during the installation of the ball valve 3/8". A fingerprint can affect the measuring results.



Prior to installation, allow compressed air to flow off to remove condensate and particles. This prevents needless contamination of the ball valve and of the sensor unit.

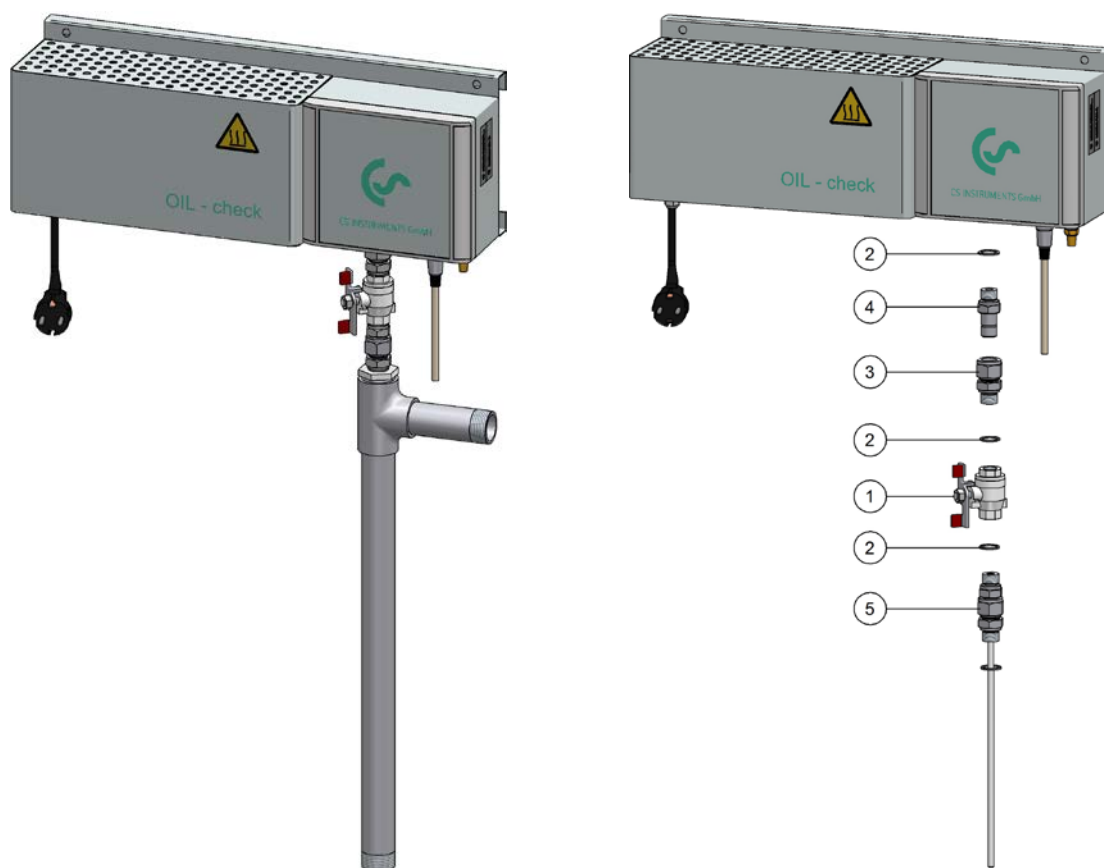


**DANGER!**

Overpressure!



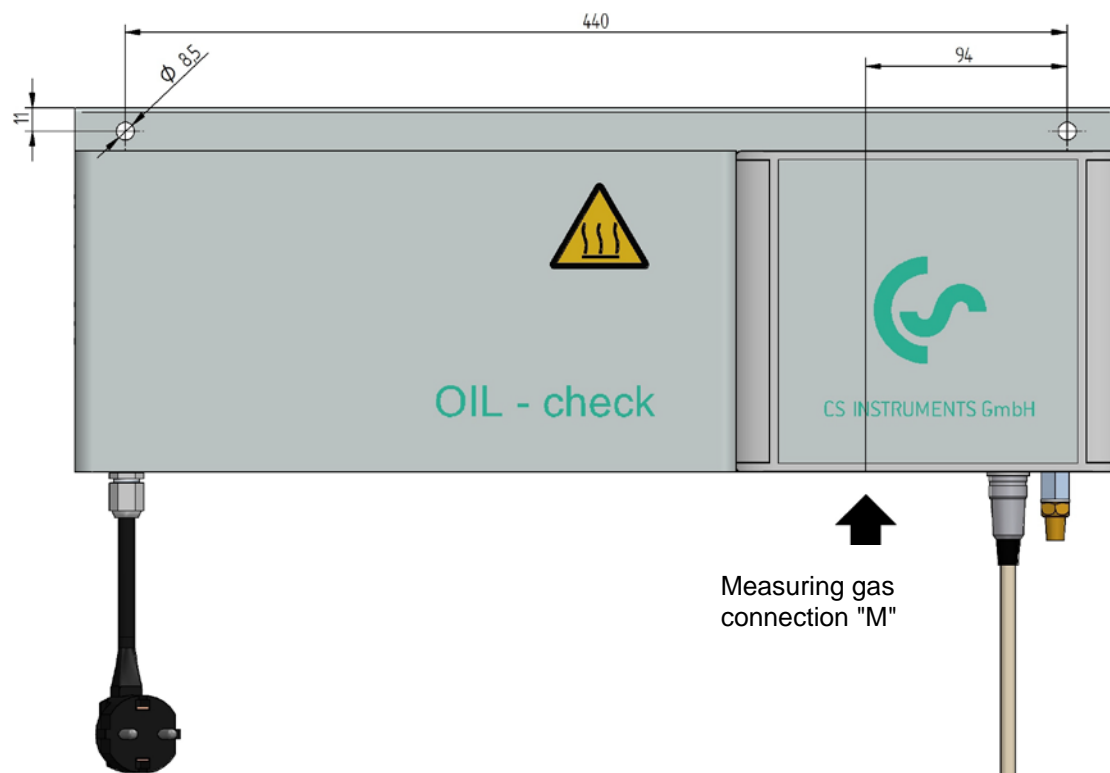
Before starting installation, it is imperative to ensure that the compressed-air line is pressureless!



- 1 - Ball valve G 3/8" with wing handle free from oil and grease
- 2 - Gasket 3/8"
- 3 - Screw-in connector stainless steel
- 4 - Nozzle stainless steel
- 5 - Sampling probe

## Mounting of the sensor unit

If required, the sensor unit can be mounted via the two available bores in the carrier plate on the wall or on a mounting bracket.



Translation of the original manual/instructions.

Original instructions are in German.

OIL CHECK\_manual\_en\_2012-04

Subject to technical changes / errors excepted.